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**FROM MICRO-STRESSORS TO TRAUMATIC STRESS: IMPACT ON
MENTAL HEALTH AND BEHAVIOR**

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Summary

Previous research addressed how stress can influence mental health and behavior with a little focus on specific aspects of stress exposure, thus, this work aimed to provide integrative evidence on how different facets of stress exposure may affect mental health and both positive and negative behaviors by also shedding light on the role of potential specific individual and environmental moderators. In doing so, we conducted several studies exploring the effect of different sources of stress, in terms of type, degree, nature of event (from micro to traumatic) and duration on mental health and behavior considering the moderating role of individual (i.e., emotional intelligence and self-compassion) and environmental factors (i.e., culture, social support).

The first set of studies focused on a severe source of traumatic stress that is the recent war in Armenia. Specifically, we investigated the short (immediate) and long-term impact of war on mental health while considering whether and how individual characteristics, like self-compassion and emotional intelligence can work as protective factors at two different phases of post-war adaptation (Study 1). We conducted Study 2 within the same population and aimed to explore the psychological impact of war on civilians by examining the direct and interactive effect of environmental factors like perceived social support and ethnic identity on post-traumatic symptomatology after the war. As a second step we examined the link between different sources of stressful and traumatic life events and their potential effect on behavior. Namely, in Study 3 we examined the relationship between stressful and traumatic events having different durations and maladaptive behaviors, such as alcohol use by considering the potential moderating role of environmental factors like social support. Last, we also investigated (Study 4) the effect of different types of acute laboratory micro stressors.

More precisely, we assessed if different types of acute micro sources of stress could impact adaptive behaviors (prosocial behaviors such as donations) once again considering the possible moderating role of specific individual characteristics (i.e., emotional intelligence). These studies allowed us to better understand the war-stress effect on mental health and ethno-cultural aspects (Study 1 and 2), stress-related maladaptive behavior (Study 3) as well as stress-related adaptive behavior (Study 4).

In Study 1, we explored the impact of war-related stress on civilians. In particular, we aimed to investigate how the exposure to the 2020 Nagorno-Karabakh war influenced post-traumatic stress symptoms (PTSS) of Armenian civilians shortly after the event and after six months as the population adjusted to the after-war phase. We further aimed to test whether and how individual characteristics (i.e., emotional intelligence and self-compassion) moderated the war-PTSS link at the two different post-war phases. The results revealed that participants reported significantly greater PTSS shortly after the war as compared to 6 months after the war ended. It was also found that while lower self-compassion was related to more PTSS at the beginning (shortly after the war), lower emotional intelligence was associated with more symptoms 6 months later.

In Study 2, we studied the psychological impact of the 2020 Nagorno-Karabakh war on Armenian civilians' mental health focusing on cultural aspects. In particular, the main goal of this study was to explore the effect of war on civilians by examining the direct and interactive effect of cultural and environmental characteristics such as ethnic identity and perceived social support on post-traumatic stress symptoms following the exposure to war. The results showed that higher social support was directly related to fewer post-traumatic stress symptoms. Furthermore, we found a significant interaction between ethnic identity and social support; specifically, among individuals perceiving lower social support from friends and

family those with higher ethnic identity reported more post-traumatic stress symptoms than those with lower ethnic identity.

In Study 3, we focused on the link between different sources of potentially traumatic stress and their possible effect on maladaptive behavior. The aim of this study was to explore the relationship between stressful and traumatic life events, with different amount and duration, and maladaptive behaviors like alcohol use. Moreover, we examined how environmental variables like social support may moderate the stress-alcohol use link in women and men. The results revealed that longer stress duration and more stressful events were associated with more regular alcohol use and greater alcohol consumption respectively. And more stress events and longer duration were each associated with higher alcohol use severity (AUDIT score). Stress duration interacted with sex and SS to predict AUDIT score: longer event duration with low social support for women or high social support for men predicted higher AUDIT score. Stress quantity also had a trending interaction with social support and sex to predict the amount of alcohol use in the same direction as with the AUDIT scores.

In Study 4, we investigated the impact of different types of acute laboratory micro stressors (i.e., social, cognitive, emotional stress) on positive and adaptive behaviors like prosocial behavior. Specifically, we aimed at exploring whether different types of stress, potentially experienced at different levels, influenced peoples' prosocial behavior (willingness to help, donations) while considering moderating role of individual characteristics like emotional intelligence. The results of this study showed that when compared to a control condition, after being exposed to a social stress, that was experienced at medium level, people were more willing to help a person in need. Additionally, our results revealed that after experiencing a social stress, participants with high (vs low) trait EI were more willing to help, and, as a result, donated more.

Taken together, the findings of this dissertation provide empirical evidence supporting the effect of different sources of stress on psychological and behavioral functioning. Specifically, we addressed the impact of war-stress on mental health and ethno-cultural aspects, as well as stress-conditioned maladaptive, and adaptive behaviors. This data contributes to a more integrative knowledge on stress outcomes in terms of consequences on health and behavior, as well as the interaction patterns of a variety of factors that act as moderators of the stress-outcome relationship. Regarding the war-stress effect on mental health, our findings support the adverse effect of war-related stress on exposed civilians by shedding light on the specific factors that may help individuals to struggle with post-traumatic symptomatology depending on specific time periods of post-war adjustment. This data was obtained studying understudied population (Armenians) that has a high probably of war exposure, thus representing an important addition to a more comprehensive conflict research data which may allow the understating of war outcomes within a broader cultural context. While further replication studies are needed for the generalization of these results our findings provide important hints for timely interventions targeting self-compassion shortly after the war and emotional intelligence later to improve health outcomes of populations like Armenians following the war exposure. In relation to the role of culture and ethnic identity on war-related outcomes, our data shed light on the existing mixed findings on the link between ethnic identity and post-traumatic stress symptoms related to war exposure by showing that strong ethnic identity may be linked to negative mental health consequences among civilians exposed to war but only among individuals perceiving low social support. In addition, even though further data is needed to study how ethnic identity and social support may affect post-traumatic symptomatology of different ethnic groups after war, our findings suggest that having enough social support from the community may potentially protect individuals with strong ethnic identity against negative health consequences after war. This data may provide important

hints for health care professionals aiming to prevent and reduce war-related psychological symptoms among ethnic groups like Armenians by targeting social support. With regard to stress-related maladaptive behaviors our findings support the notion that stressful and traumatic events may be related to dysfunctional patterns of behavior in terms of alcohol consumption and misuse by suggesting a more integrative view of stress assessment in this context. Our findings revealed a negative effect of less-studied aspect of stress (its severity) in terms of alcohol use, integrating it with well-studied facets (stress amount) suggesting that several aspects of stress may lead to maladaptive coping after stress exposure. Even though further supporting data is needed, our findings on the moderating effect of social support may provide important insights to reduce the stress-motivated alcohol drinking. With respect to stress-related adaptive behaviors our findings confirm the positive association between stress and prosocial behaviors like willingness to help and donations by providing a better understanding on the effect of different types and degrees of stress in this regard. Following the manipulation of different types of stress that participants experienced at different degrees, our data indicates that only medium level of stress may lead to other-directed behaviors, ones again contributing to a more extensive picture of stress effect on behavior through the consideration of stress as a multidimensional concept. When stress does not represent a threat for the self, rather it is related to medium level of negative affect, people who have efficient emotional intelligence skills are willing to help others potentially creating collaborative connections for future stressful situations. Overall, this work contributes to the current stress literature and provides novel insights on how different aspects of stress may be related to mental health and behavior by considering both individual and environmental factors and their role in the stress-outcome link.

CHAPTER 1

General introduction

Stress

Stress concept has been studied starting from the ancient times and, up to now it is one of the widely studied subjects by several disciplines including psychology research. Several definitions of stress have been postulated by different authors so far, and stress theories proposed a number of classifications of stress focusing on exposure, types, levels and duration of stress. In this chapter I will briefly summarize the development and history of stress research by addressing different definitions of stress and will discuss how stress has been classified by previous research. I will conclude the chapter by presenting the types of stressors we focused on for each study of this dissertation.

1.1 Stress concept: history and definitions

The concept of stress has been a subject of research in biomedical sciences for more than a century. Even though ancient philosophers and physicians were mindful of stress, the foundations of modern views of stress root back to the 19-th century when renowned physiologists Claude Bernard and Walter Cannon were postulating notions on regulatory physiology and adaptation (Le Moal, 2007). Claude Bernard, who is considered as a founder of experimental medicine, was the first to demonstrate how organisms' cells and tissues might be protected from stress. He developed the concept of "milieu intérieur" (internal environment in French) to describe the capacity of maintaining a protective stability for tissues and cells in the organism (Bernard, 1859; Fink, 2010). In line with this concept,

Walter Cannon introduced the term “homeostasis” (from words in Greek “homeoios” or similar and “stasis” or fixed). In his book “The Wisdom of the Body”, Cannon explained the concept of homeostasis as a self-regulatory process through which a living system maintains the state of steady internal, physical, and chemical conditions necessary for survival (Cannon, 1932). In addition, he coined the term “fight-or-flight” to describe the response to threat that animals have. The fight-or-flight response, also known as acute stress response, is an automatic physiological reaction that occurs in response to a perceived harm or threat to survival, in other words, it prepares the body to stay and fight or to “run-away”. The organism responds to threat with a discharge of the sympathetic nervous system which primes the animal for fighting or fleeing (Cannon, 1932; 1935). The fight-or-flight response proposed by Cannon was later recognised as the first phase of the “General Adaptation Syndrome” (GAS) conceptualized by the founder of the term “stress”, Hans Selye. In 1936 Selye described the GAS as a universal stress response among vertebrates and other organisms which consists of three phases including the alarm reaction, the phase of resistance of adaptation, and the exhaustion (Selye, 1936). With the GAS concept Selye highlighted that stress influenced the immune system and the adrenal glands. Unlike previous research on stress which was mostly focused on the regulatory systems and adaptation Selye started to study the pathology side of stress. He was the first to introduce the term “stress” and defined it as a non-specific response of the body to any demand upon it (Selye, 1936; 1976), whereas the “stressor” was referred to as a stimulus causing stress (Selye, 1976). According to Selye’s view even though individuals may face different types of stressors the pattern of stress response including biochemical, functional, and structural changes remains the same. Moreover, along with the damaging or unpleasant stress that he called “distress”, Selye introduced the positive form of stress or “eustress” related to pleasurable and satisfying experiences (Selye, 1974). He argued that whether the stimulus is pleasant or unpleasant the

factor that underlies stress response is the intensity of the demand for adaptation that the stressor creates (Selye, 1976).

By the development of stress research reconsiderations of previously postulated concepts have been done. In the late 1980s, Peter Sterling and Joseph Eyer expanded the theory of homeostasis and developed the concept of “allostasis” the precursor of which is regarded as “heterostasis” proposed by Selye. While homeostasis was believed to provide stability through constant state, allostasis, instead, was described as a process of maintaining the stability of the internal environment through change (Sterling and Eyer, 1988). The long-term result of “unsuccessful allostasis” was later referred to allostatic load which is defined as the cumulative effects of the body’s elevated endocrine or neural responses resulting from repeated or chronic stress (McEwen and Stellar, 1993). Several studies focused on physiological substrate of homeostasis, allostasis and the stress response mechanisms. For instance, the hypothalamic-pituitary-adrenocortical (HPA) systems that connects the central nervous system with the hormonal system was believed to have a central role in the stress response allowing the organism to adapt to an increase in demands and maintain homeostasis after challenge (Smith and Vale 2006).

The concept of stress was enhanced also by Richard Lazarus who was the proponent of a cognitive–motivational–relational theory of emotion (Lazarus, 1966). The works of Lazarus enriched the existing stress literature by the focus on cognition, coping, and individual differences. He defined psychological stress as a specific relationship between the person and the environment when the latter is appraised as exceeding one’s resources and as a potential threat to the well-being (Lazarus and Folkman, 1984). That is, cognitive appraisal plays a key role in the evaluation of the situation as potentially stressful which further enables the use of coping strategies in order to adjust to the situation. According to Lazarus, individual

differences have a role in successful coping or maladaptive response to stress (Lazarus, 1966).

Recent approaches of stress research advanced existing theories by proposing evidence-based adaptations of previous models and new perspectives. For instance, some of these concepts emphasize that stress is characterized by the absence of anticipatory response (unpredictable) or reduced recovery (uncontrollable) of the physiological reaction (see, Koolhaas et al., 2011). An important line of research is related to the work of Kim and Diamond (2002) which suggests a three-component definition of stress. They proposed that stress requires a heightened excitability or arousal; the experience must also be perceived as aversive; and a lack of control is expected. They emphasized the role of control or predictability in the magnitude of the stress experience and the response to it. The terms controllability and predictability in stress research had already been coined by Weiss (1972). He conducted a number of experiments on laboratory rats and concluded that the degree in which the stress stimulus can be predicted and controlled, rather than the physical nature of it, induces pathology. Later studies on human research elaborated this notion arguing that not the actual but perceived control may be relevant for human stress response (Salvador, 2005). In line with these studies, the perspectives of Maier and Seligman (2016) also focus on the extent to which stressors are controllable or escapable.

Furthermore, the neurovisceral integration model proposed by Thayer and colleagues is an important contribution to the works on stress response and health. In this model, they propose that individual's ability to flexibly adapt to the environment is linked to biological flexibility within the central autonomic network. A core aspect of this flexibility, according to them, is behavioral flexibility (Thayer and Friedman, 2002). It is considered that perceptions of threat and safety are likely to be key elements in stressors especially provoked by mental events. From the evolutionary point of view these perceptions and related actions are critical since

they improve the chances of survival (Thayer et al., 2012). More specifically, it is believed that the “default” response to uncertainty, novelty, and threat is the sympatho-excitatory preparation for action or the so-called fight-or-flight response (Herry et al., 2007; Thayer and Lane, 2009). This default threat response appears to be related to a phenomenon called “negativity bias” which is the individual’s tendency to prioritize negative information over positive (Cacioppo et al., 1999). As such, when facing uncertainty, being prepared for the “negative” has an evolutionary advantage by maximising survival and promoting adaptive responses (LeDoux, 1996).

It is worth mentioning, though, that in daily life, a continuous perception of threat is typically maladaptive and related to negative health outcomes (e.g., McEwen, 2001; Sapolsky, 1996). Given the default response to uncertainty and novel situations may be the threat response related to negativity bias which may have adverse consequences if experienced chronically, several studies examined the mechanisms underlying adaptive stress response. For instance, Maier et al. (2006) emphasized that perceptions of uncontrollability of the situation may be a key feature in boosting the stress response. The authors also focused on the role of frontal brain regions activity, specifically, ventromedial prefrontal cortex (vmPFC), for protective effects of behavioral control on the stress responses. According to their view, the vmPFC inhibits threat circuits, which are prone to be active by default, by integrating the external context like environmental threat with the internal one such as perceptions of control over threat. In addition, Thayer et al. (2012) suggest that the heart rate variability is an index of “top-down” appraisals and is involved in vertical integration of the brain mechanisms important for the flexible control over behavior.

Given the complex definition of stress and the multiple facets of stress it is important to clearly define it. In this dissertation, we define stress as an adaptive way to mobilize energy and motivate behavior when facing danger (Sapolsky et al., 2000; McEwen and Akil, 2020).

Stress responses are conceptualized in terms of biological and behavioral mechanisms which are important for survival and are mediated by dispositional factors within the individual (Kim and Diamond, 2002). When stress exposure occurs a set of neurohormonal responses happen together with a general unspecific physiological response that can also be linked with a specific subjective emotional experience (Del Giudice et al., 2018). And this complex set of responses may fluctuate depending on stressor's nature, intensity, and duration, as well as several individual factors that will be discussed in the next chapters (Joëls and Baram, 2009).

1.2 Classification of stress: exposure duration, types, and intensity

People may experience different types of stress during daily life which may significantly differ one another in various ways. For instance, stressors can differ in terms of exposure duration, that is, individuals may be exposed to a stressful situation at short-term (acute) or stressors may be long lasting (chronic). Moreover, the events provoking stress may have different nature varying from micro stressors to traumatic experiences. Finally, people may face stressful situations of different degrees having from low to high intensity. Various types of stress may trigger different affective, cognitive, and behavioral responses, while affective response to different stressors may influence individuals' appraisal of the environment or situation which can be related to specific health outcomes and behaviors.

In terms of duration of the exposure both acute and chronic stressors can be identified. Acute stress is defined as a short-term exposure to various challenging or distressing situations. Such sources of stress can be re-created through specific laboratory tasks (such as mental arithmetic, speech in public, or distressing images or videos) or are represented by naturalistic events that an individual may be exposed to daily (Delahanty and Cremeans-smith, 2002). While acute stress may last from a few minutes to a few hours, chronic stress is referred to a stressor persisting for weeks to months (Sorrells et al., 2009).

Furthermore, people may be exposed to a variety of potentially stressful events, including micro and traumatic stressors, that can have different nature. Several micro stressors have been studied by previous research including social evaluation and social exclusion (Kogler et al., 2015) or cognitive stress related to workload and demanding tasks (Roesch et al., 2002) as well as emotional cues or situations that evoke negative and distressing emotions (van Stegeren et al., 2008). Each of these stressors may differently influence the individual in terms of affective state and the stress response patterns. That is, for instance, exposure to social stress may be linked to increased arousal and anxiety when the interaction with others seems threatening (Dickerson et al., 2008). During cognitive stress a high amount of cognitive effort may be needed which can be perceived as too taxing (Van Bockstaele et al., 2020). And emotionally distressing cues may require a mobilization of a significant amount of energy to manage the triggered negative emotions (Mendelson, 2013). On the other hand, traumatic stress is typically provoked by potentially traumatic events that people experience such as natural or man-made disasters, violence, serious accidents or unexpected and sudden loss of loved ones. For example, wars are considered as one of the most serious potential traumatic events, exposure to which can lead to severe health problems (Steel et al., 2009; Yousef et al., 2021).

The general objective of this dissertation is to examine how stress may affect human health and behavior. So far, much attention has been paid to conceptualize the stress construct and to study a variety of adversities and potential stressors that people face during daily life. However, little is known on how different stressors may have varying consequences for health and behavior (Hammen, 2005, Monroe, 2008). Starting from this framework within this dissertation we addressed a number of different sources of traumatic, macro and micro stressors of different duration (ranging from a few minutes to several months) and level (from low to high) investigating their effect on mental health and behavior while also accounting

for several potential moderators. The first set of studies focused on a severe source of traumatic stress that is the recent war in Armenia. Specifically, we investigated the short (immediate) and long-term impact of such traumatic event on mental health while considering how different individual characteristics could work as potential protective factors (Study 1). We conducted Study 2 within the same population and aimed to explore the psychological impact of war on civilians by examining the direct and interactive effect of environmental factors like perceived social support and ethnic identity on post-traumatic symptomatology after the war. As a second step we examined the link between stressful and traumatic life events and their potential link on behavior. In study 3 we considered the exposure to different sources of potentially traumatic stress having different durations and whether this could be linked to maladaptive behaviors, such as alcohol use. Last, we also investigated (Study 4) the effect of different types of acute laboratory micro stressors. More precisely, we wanted to assess if different type of acute micro sources of stress that can take place in everyday life could impact behavior. In this case we focused on positive outcomes (i.e., prosocial behaviors such as donations) once again considering the possible moderating role of specific individual characteristics.

CHAPTER 2

Impact of stress on mental health and behavior

Stress and trauma have a major impact on well-being, mental health, and behavior. The relationship between stress, health and behavior is affected by the nature, number, intensity, and persistence of the stressors as well as by individual characteristics, psychosocial resources and learned patterns of coping. While the negative effect of stress and trauma on mental health is well-known the possible protective factors that could explain a successful adaptation after stress exposure are still poorly explored.

Literature on the effects of stress has shown how exposure to different types and intensities of stress may be linked to both maladaptive and adaptive behaviors (e.g., de Waal and Suchak, 2010; Jose et al., 2000; O'Doherty, 1991; Taylor et al., 2000). For example, recent stressful events can be related to maladaptive ways of coping, such as engaging in drinking alcohol to relieve stress-related tension and negative affect (Goldman et al., 1991; Hermes et al., 2021), whereas a certain amount of acute stress can support prosocial acts toward others in need (e.g., Von Dawans et al., 2012). Different types of stressors experienced in different degrees, amounts and severity may affect the stress and behavior link in a specific way. In this chapter, I will present existing findings on stress, health, and behavior, and will focus on several important aspects requiring further exploration that we tried to cover through conducting several research studies for this dissertation.

2.1 Traumatic stress and mental health

The World Health Organisation describes mental health as a state of mental well-being which allows people to cope with the life stressors and consider it as an integral component of health crucial for building relationships, having personal, professional, or working life, and contributing to the community (World Health Organization, 2018). The adverse effects of stress on mental health have been a multidisciplinary concern for decades. It is well-known that stress and trauma have a negative impact on mental health for example increasing the chances of developing clinical depression, anxiety and PTSD (Hammen, 2005; Kendler et al., 2003; Bryant, 2019). A positive association between stress and depression has been reported (Kessing et al., 2003) and studies have shown how stress exposure may be the leading cause for the onset of depression (Hammen, 2005). There is evidence showing that first depressive episodes are often preceded by the exposure to stressful events (Paykel, 2001). Anxiety is another well-studied unfavorable mental health outcome related to stress. Large amount of data exists on the link between stress and anxiety showing that anxiety disorders often develop following the exposure to stress (e.g., Kendler et al., 2003). It is likely that stress-related mental problems have a certain relationship. That is, several follow up studies showed that anxiety commonly occurs before depression (Breslau et al., 1995). In line with these findings, Brown et al. (1986) had previously shown that patients with anxiety tend to develop major depression after stress exposure. Finally, exposure to stressful and traumatic events can be related to substantial mental health issues such as PTSD. It is well-established that PTSD is one of the most frequently reported mental health disorder after the exposure to stressful and traumatic events (Bryant, 2019).

Lifetime exposure to traumatic events in the general population is high ranging from 40% to 70% (Norris, 1992). People that can be exposed to a variety of potentially traumatic events across the lifespan may be at risk of developing several psychological problems and disorders. Among other mental health issues, including depression and anxiety disorders (see Schneiderman et al., 2005), one of the most registered problems that arises following a traumatic experience is PTSD and its related symptoms (Bryant, 2019). Moreover, there is evidence that certain features of traumatic events are more likely to trigger PTSD. Previous data showed that, compared to other traumatic events, interpersonal violence (Forbes et al., 2011; Forbes et al., 2013), namely, organized, physical or sexual violence are related to higher rates of PTSD (Liu et al., 2017). In fact, wars, that are organized mass violence, are considered as one of the most disastrous sources of potential traumatic stress. Exposure to such events may lead to severe mental health problems (Steel et al., 2009; Yousef et al., 2021). Follow up studies report that the negative psychological impact of war may also have a long-lasting pattern. For instance, Macksoud and Aber (1996) found that more than 40% of Lebanese children continued to have post-traumatic stress symptoms (PTSS) 10 years after the war exposure. Hence, the devastating consequences of wars are not limited to the dramatic loss of human lives, territorial destruction, and economic crisis, but include massive negative psychological impact as well, manifested both immediately and after many years. There is evidence on the negative psychological outcomes of war on different populations around the world which have been exposed to war trauma. For instance, high rates of PTSS were found among civilians after the 2018 Gedeo–Guji conflict in Ethiopia (Madoro et al., 2020); or following the organized violence and war in Kosovo (Eytan et al., 2004); and after the exposure to war in Croatia (Stevanović et al., 2016). It is considered that the degree of exposure to traumatic events is an important factor for subsequent health outcomes, that is more extreme exposure to traumas is related to more health impairments and less successful

adaptation (Masten et al., 2015). And when facing the traumas such as war, the health risks may be based on exposure degree, and challenges or changes experienced in the life (MacDermid et al., 2008). Moreover, existing data reports that not only direct, but also mediated war exposure can severely impact mental health including media exposure to images or videos of traumatic events (Silver et al., 2013; Thabet et al., 2014).

Even though direct and indirect exposure to wars and organized violence are among the strongest factors predicting impaired mental health (Liu et al., 2017; Murthy and Lakshminarayana, 2006; Scoglio and Salhi 2021; Steel et al., 2009), large variability exists in how trauma-exposed individuals psychologically respond to such events, with some people developing severe mental disorders (e.g., PTSD), and others adjusting and functioning well (Masten et al., 1990). Hence, there can be several individual and contextual factors that may influence the trajectories of traumatic stress response among different individuals.

Overall, previous research constantly reported that exposure to stress and trauma is related to impaired mental health including depression, anxiety and PTSD as well as a wide range of health-related problems such as cognitive impairment, substance abuse, increased smoking, sleep problems, and eating disorders (David et al., 1996; Schnurr et al., 2002; Shalev, 2001; Colby et al., 1994; Harvey et al., 2003; Welch et al., 1997). At this point, it is critical to study factors that protect individuals against having adverse health outcomes after war exposure.

Even though there is some evidence on how certain individual characteristics (i.e., emotional intelligence and self-compassion) may increase the chances of successful post-war adaptation, little is known about time-specific effects of these factors on mental health following the war exposure. Moreover, literature is still scarce on research studying populations that are repeatedly exposed to military conflicts and have a high probability of frequently facing war-like situations, such as the Armenian population. Thus, we tried to cover above-mentioned gaps in Study 1 and Study 2 that will be presented in chapter 4 and 5.

2.2 Stress and behavior

The stress and behavior link has been a target of research since the times of early studies on stress (e.g., Cannon, 1932; Levine, 1971). Stress has been consistently associated with behavior, learning, habituation to a stressful stimulus, and it was thought that effective behavior may eventually depend on the exposure to some optimum level of stress (Levine, 1971). While stress was initially linked to immediate, and autonomic behaviors such as startle response of an animal exposed to a sudden sound (e.g., Levine, 1971), human stress-provoked behavior is believed to have also other sophisticated forms including, but not limited to social behaviors or practices like reward seeking (e.g., alcohol, drugs, food). Depending on the type and intensity of the stressors, and together with several contextual and individual factors, human behaviors following a stressful situation may be either maladaptive or adaptive. Specifically, both short- and long-term exposure to different types of stressors may transactionally elicit a behavior that, as I will now describe, can be dysfunctional or functional for the individual.

2.2.1 Stress and alcohol use as maladaptive coping behavior

Stress-related dysfunctional and maladaptive behaviors, and, more generally, pathologies associated to stress have received much attention by previous research. Existing data supports the hypothesis that people who are exposed to stress and trauma are at high risk of engaging in unhealthy behaviors in an attempt to cope with negative consequences of stress (Sinha, 2001). For example, individuals who experienced traumatic events may have maladaptive behaviors such as binge drinking, unlawful drug use, or increased emotional eating (Davis et al., 2020; Hingson et al., 2017; Jastreboff et al., 2013). Stress can also influence the flow of lifestyle habits. For example, exposure to potentially traumatic events was linked to unwanted

lifestyle patterns such as the use of over the counter sleep aids, gambling, and increased television and social media use (e.g., Hermes et al., 2021).

Alcohol use is one of the most commonly reported unhealthy behavior among people who experienced stressful and traumatic events. Previous findings showed that individuals under stressful conditions and following negative life events are likely to consume alcohol (e.g., Jose et al., 2000). People may drink alcohol in different occasions, and motivations to drink alcohol may vary depending on social, environmental, situational, and individual factors. For instance, people can regularly drink alcohol as a part of social interaction, or they may consume alcohol to dampen negative affect. It is believed that alcohol serves as a coping mechanism since people often drink alcohol in order to cope with the adverse effects of stress (Krause, 1991; Serre et al., 2015). The buffering effect of alcohol is present both in social and problematic drinkers who expect alcohol to relieve tension and stress-related negative emotions (Goldman et al., 1991).

Stress-related drinking is associated with serious unfavorable health outcomes given the exposure to stressful and traumatic events may increase the risk of binge and heavy alcohol use (Blaine and Sinha, 2017). It was found that people who abuse alcohol report more stressful life events as compared to non-abusers (O'Doherty, 1991). The previous data showed that stress-motivated alcohol consumption can lead to alcohol use disorders (AUD; Sinha, 2008; Sinha, 2012). Human models of addiction such as tension-reduction and self-medication models, link alcohol consumption with the basic need to boost positive affect through either positive reinforcement (mood enhancement) or the negative one (relief from stress) (Swendsen et al., 2000; Verheul et al., 1999; Weiss et al., 1992). Initially, when people start to impulsively consume alcohol, they are reinforced not only positively by its euphoric effects but also negatively by its anxiolytic effects. However, once they progress into AUDs, their alcohol drinking is mostly driven by the negative reinforcement and alcohol provides

relief from uncomfortable and unpredictable emotional states (Koob, 2013). Clinical studies on alcohol abusers show that over the course of time alcohol does not provide the enjoyment as it does initially, and that there is a lack of conscious desire to drink, instead alcohol drinking becomes an automatic response to alcohol-associated environmental cues (Heinz et al., 2009). Moreover, it is hypothesized that subconscious attentional biases, rather than conscious desire to drink, are likely to underly compulsive alcohol consumption (Claus and Hutchison, 2012).

Previous literature reports that the link between stress and alcohol use may vary by sex. For instance, men are traditionally believed to have higher rates of alcohol use, heavy drinking, and alcohol disorders (Keyes et al., 2011). However, it is worth noting that according to the recent findings the rates of drinking among women are significantly increasing (Gruca et al., 2018). This increase is a matter of concern given the fact that women tend to have more alcohol related health problems than men (Agabio et al., 2016). Moreover, it was found that women report higher rates of traumatic and stressful events (Guinle and Sinha, 2020) and related mental health negative outcomes (Olf, 2017). These findings suggest that stress may represent one pathway to problematic drinking more common to women than men (Guinle and Sinha, 2020). Yet, there are studies reporting that the effect of stressful life events on alcohol use is stronger for men (Dawson et al., 2005; Veenstra et al., 2006). Taken together, these data support the notion that sex can be an important moderator of the stress and alcohol use relationship.

Stress and trauma can impact coping behaviors and the markers of health and physiology, however, the meta-analyses studies show that such effects are not always replicated (Klaassens et al., 2012; Shalev et al., 2008). The inconsistency of previously reported data suggests that the effect of stress on coping behaviors may vary depending on specific aspects of stressors. That is, people may face stressful events with different intensity or duration,

some of which being short-term and others having long duration. For instance, events like natural disasters or serious accidents are naturally linked to acute exposure. On the contrary, violence, financial difficulties, relationship issues may potentially have longer durations. It has been found that the longer duration of stressful events can lead to adverse mental health outcomes, (Buydens-Branchey et al., 1990), and behavioral disabilities (Wilson, 2010). As such, studying how stress duration might influence alcohol consumption of individuals who experienced stress would provide a significant contribution to the existing findings. Previous studies exploring the relationship between stress and alcohol use mainly focused on the number of stressful events or the event type (Slopen et al., 2011; Glass et al., 1995; Shaw et al., 2011) however, studies directly assessing how stressful event duration may influence stress-related alcohol drinking are rare. Hence, we tried to explore this effect in Study 3. Overall, stress-potentiated alcohol use and related clinically significant addictions are a matter of concern given that the excessive alcohol consumption can have adverse social, psychological, and medical consequences, including increased risk for mortality (Shield et al., 2014; Rehm et al., 2010). Even though a body of evidence reports the positive association between stress and alcohol use, existing discrepancies emphasize the need to further explore less studied aspects of stress such as stressors' intensity (or the event duration, as we referred to it in this work). Thus, in Study 3 we carefully assessed the effect of stress, including the quantity and the intensity of the stressor, on people's alcohol use behavior while also focusing on potential protective factors such as social support (see next chapter).

2.2.2 Stress and adaptive behaviors: prosociality in response to stress

The relationship between stress and adaptive behaviors is less studied as compared to the literature on maladaptive and dysfunctional forms of stress-related behaviors. Yet, it is worth

considering that the effect of stress on behavior is not necessarily negative, it can sometimes lead to adaptive behaviors promoting survival and well-being at the individual and group level. In response to stressful events there is a significant amount of literature reporting individuals' aggressive or avoidant behaviors (i.e., fight-or-flight response). However, human stress response is more complex than it was originally thought, and it can include other, more adaptive patterns such as tendency to affiliate. Namely, under stress, people sometimes come together in groups to provide and get joint protection in stressful times (Taylor, 2002). Taylor et al. (2000) proposed a concept of "tend-and-befriend" described as an affiliative response to stress among females which includes tending or protective and caring response toward offspring and befriending or connecting with others to collaborate under stressful conditions. Several other studies supported this concept and showed how stress may lead to other-directed behaviors like the tend-and-befriend response also in males (Takahashi et al., 2007; von Dawans et al., 2012; Vinkers et al., 2013).

According to Yerkes-Dodson law (Yerkes and Dodson, 1908), or more commonly described in the stress psychology as inverted-U model of arousal and stress, behavioral performance may be increased under stress when the level of stress is medium, however, when the stress level gets too high, or it is very low performance decreases. When thinking about the stress and behavior link, at medium levels of stress people may have adaptive, social behaviors unlike at high or low levels of stress (Wolf et al., 2015).

Humans, as social species are pre-programmed to interact with one another and cooperate in order to survive and prosper. The first example of such behaviors manifests right after birth when the newborn in distress relies on others (main caregiver) to survive and as a consequence cries for help and support. Furthermore, humans have always been seen across cultures and history as prosocial species willing to help others; for example, already ancient philosophers considered the act of one person helping another as the greatest of human

values. Prosocial acts are, indeed, fundamental features of a healthy and well-functioning society (Nelson et al., 2016; Van Tongeren et al., 2016). Being prosocial and willing to help at times of stress is particularly important and can lead to significant mental and physical health benefits. It is well-known that social behavior at times of stress is related to adaptive coping and resilience while the lack of social behavior, and social isolation during stress are linked to increased risk of mental disease (Beery and Kaufer, 2015). Thus, prosocial behaviors can be considered as an important aspect of adaptive response to stress emphasizing the need of better studying the mechanisms underlying stress-provoked prosocial behavior.

Here, we define prosocial behavior as someone's voluntary intention to serves others at a temporary cost to the self (Eisenberg and Miller, 1987). Previous literature has constantly reported that stress can promote prosocial behaviors like empathy and altruism (Taylor et al., 2000; de Waal and Suchak, 2010). Several studies explored how acute micro stressors may be related to individuals' prosocial behavior. For instance, Von Dawans et al. (2012) reported positive relationship between acute stress (giving a speech in public) and prosocial behavior showing that participants in the stress condition (vs control) were more engaged in prosocial behavior such as trust, trustworthiness, and sharing. However, these studies need further confirmation since there are also contradicting data showing that stress may be related to the reduction of helping others when the participants were exposed to acute micro stress like speech in public (Vinkers et al., 2013). Consistently, recent studies revealed that the effect of acute stress, provoked by time pressure or cognitive load, on altruistic behavior was barely significant (Tinghög et al., 2016; Fromell et al., 2020).

It is possible that specific aspects characterizing different sources of stress may be important in describing its effect on potential positive and prosocial behaviors. For example, the perception of a stressful situation as challenging (rather than threatening) may underly the

individual's response to another in need in a more prosocial manner (Lazarus and Folkman, 1984; Buchanan and Preston, 2014). Moreover, evidence shows that prosocial responses during stress are more possible when the observers do not fear for their own safety and do not have conflicting personal goals (Preston and De Waal, 2002; Preston, 2013).

To sum, the relationship between stress and prosocial behavior is poorly studied, and further research is needed to explore how different aspects of stressful situation may be associated with such behaviors. Various types of stress may be related to the mobilization of different resources needed to restore the homeostasis and this can be linked to different behaviors aimed toward or away from others. Additionally, it is believed that the level of stress experienced may be an important factor underlying the link between stress and prosocial behavior (Wolf et al., 2015). Therefore, studying the effect of different types of stressors, potentially experienced at different intensities, on people's prosocial behavior, that we tried to conduct in Study 4, may shed light on the existing data.

CHAPTER 3

Possible moderators of stress and outcome relationship

As I discussed in previous chapters, stress influences different aspects of mental health and behavior. It is worth noting, though, that this relationship is not always present through direct associations, rather a number of individual and environmental factors may interact with the stressor to eventually affect health and behavioral outcomes of stress exposed individuals. The socio-ecological model (Bronfenbrenner, 1979; Bronfenbrenner, 1986) focuses on the importance of the interplay between individual, relationship, community, and social factors across the development of an individual. Following this model, this chapter discusses how different individual and environmental factors may moderate the link between stress and health and stress and behavioral outcomes. Specifically, I will summarise the current research findings reporting the possible role of the aforementioned characteristics in the stress and outcome link and will discuss the existing lack of knowledge and discrepancies that we tried to cover through this dissertation.

3.1 Stress, mental health, behavior, and individual characteristics

The psychological response to stress and stress-related behaviors do not have a pattern typical to all human beings, instead, they are specific and unique to each individual. For instance, following the exposure to stressful and traumatic events, some people develop clinically significant disorders, however there is a portion of people who are able to confront it and resiliently adapt to it. Moreover, individuals who are exposed to the same stressor may respond differently based on how they perceive the event. The stress response strongly

depends on one's appraisal of the specific stressor, how individuals perceive the given situation and evaluate potential threat (whether or not the stressor exceeds own resources) which further enables the use of coping strategies for adjustment. Individual differences play a key role in the perception and appraisal of stress and affect coping (Lazarus, 1966; Lazarus and Folkman, 1984). In fact, it is believed that several individual characteristics influence the human stress response and related health and behavioral outcomes.

In particular, emotional intelligence and self-compassion are well known for their protective role against negative health outcomes of stress, that is emotional intelligence may favor positive adjustment after stress, while self-compassion can buffer stress effects (e.g., Masten, 2018; Salovey et al., 2008; Kearney et al., 2013; Hiraoka et al., 2015). Moreover, emotional intelligence may promote positive behaviors after stress exposure (e.g., Agnoli et al., 2015). Yet, there are several important aspects that require further considerations that I will present below.

3.1.1 The impact of emotional intelligence on the link between stress and outcome

As human beings we all experience a variety of emotions during our daily life. And even though it is a universal and intrinsic human characteristic, people markedly differ in the extent to which they identify, process, utilize and regulate their own emotions and feelings and those of others (Petrides and Furnham, 2003). Emotional intelligence is a construct that has been developed to account for this variability. The research on emotional intelligence is divided into two distinct perspectives which share the same idea that emotional competencies are one of the key components of successful adaptation. However, these perspectives differ in terms of conceptualisation and measurement of such emotional competencies. The first line of research includes «ability» models suggesting that the EI is an ability, and that it is a four-

dimensional concept comprising emotions identification; emotions utilization; emotions understanding; and emotions regulation (Salovey and Mayer, 1997; Brackett and Salovey, 2006). The second perspective is based on «trait» models which refer to EI as a multifaceted construct encompassing a number of emotion-related behavioral dispositions that influence on how individuals cope with the demands and challenges (Bar-On, 1997; 2006; Petrides and Furnham, 2003). While the ability EI is measured through intelligence-like tests which capture the maximum performance, the trait EI is assessed by personality-like questionnaires aiming to capture typical performance (Petrides and Furnham, 2001). The research studies of this dissertation focus on the second perspective measuring the trait EI. In this work, the trait emotional intelligence is defined as “perceived emotional self-efficacy” and measures people’s tendency to perceive and manage their emotions (Sevdalis et al., 2007). Trait EI includes a series of emotion-related personality traits and is considered as a broad and general dimension of personality (Petrides et al., 2007). There is a large individual variability in regulation strategies that people have, and while targeting specific regulation strategies may include the risk of not capturing this variability, measuring trait EI can allow us to focus on the flexibility and adaptability of people’s regulation. Therefore, it is believed that compared to the study of specific regulatory strategies, trait EI is a better measure of individual differences in emotion regulation (Peña-Sarrionandia et al., 2015).

The protective effect of emotional intelligence on health among stress exposed individuals has been systematically reported. Previous research studied individual differences in how people react to challenging and stressful situations and reported a high variability in stress response among individuals. This variability is present also within the responses to different stressors of the same individual depending on the appraisal of the given situation (Lazarus and Folkman, 1984). It is believed that stress responses vary significantly among individuals in relation to how effectively they regulate their emotions. And emotional intelligence has

been constantly referred to as one of the most important factors moderating stress response since it is related to stress regulation and successful adaptation (e.g., Petrides, 2009).

Generally, emotional intelligence is shown to predict good health, successful relationships, educational attainment, and work-related success, hence, higher levels are generally regarded as beneficial (Brackett et al., 2011; Petrides et al., 2016). For instance, people with high levels of trait EI tend to have high levels of trait happiness, trait optimism, and self-esteem and, overall, they have effective stress management skills (Petrides, 2009). The existing literature reports that trait EI scores may be the predictors of the impact of stressful events not only in real life but also in laboratory conditions (Ciarrochi et al., 2002; Mikolajczak et al., 2007a; Slaski and Cartwright, 2002; Mikolajczak et al., 2007b). And this moderating effect of trait EI on stress reactivity is present both at subjective level and at the neuroendocrine one (Mikolajczak et al., 2007c).

There are several plausible explanations for the protective effect of EI against negative consequences of stress. For instance, it is believed that people with high (vs. low) trait EI are more likely to downregulate intense emotions (such as fear, anger, or sadness) in stressful situations, and are more prone to perceive events as less negative (Peña-Sarrionandia et al., 2015). Moreover, individuals with high trait EI appraise a stressful situation as a challenge, rather than a threat (Mikolajczak and Luminet, 2008). And, given EI may lead to efficient processing of positive and negative emotions (Fernández-Berrocal and Extremera, 2006), it is possible that high EI promote faster mood recovery following stressful exposure (Salovey et al., 2002). Together all these findings suggest that people who are effective in perceiving, processing and regulating their emotions, which are the key elements of EI, have better chances to successfully confront with stress and have less negative mental health outcomes or more positive behaviors after stress exposure.

The literature reports that emotional intelligence can promote resilience and successful adaptation following the traumatic stress exposure as well (Masten, 2018). For instance, it was shown that the EI has been associated with posttraumatic growth among trauma exposed individuals (Li et al., 2015; Sadeghpour et al., 2021). Consistently, Tuck and Patlamazoglou (2019) reported a relationship between EI and posttraumatic growth. It is, normally, believed that high levels of EI are related to less PTSD symptoms (Stough et al., 2009), which is a disorder caused by traumatic stress exposure. However, even though high scores on trait EI have been linked to the use of effective coping strategies in response to stressful situations (e.g., Salovey et al., 2008), resilient adaptation after trauma (Masten, 2018), little is known about how trait EI influences one's response to war-related traumatic stress. More importantly, the extent to which EI may help individuals cope with war-related traumatic stress and its potential protective role at different post-war phases remains unexplored. Therefore, we studied the potential moderating role of trait EI on war trauma-PTSS link in Study 1.

Additionally, given emotional intelligence buffers stress-related adverse consequences one may expect that high trait EI can positively moderate also the stress and adaptive behavior link. Although the protective role of emotional intelligence on stress response and its health outcomes is well-defined, there are very few studies testing how trait EI could influence positive behaviors in response to stress exposures. One of these few studies reports that the impact of stress on prosocial behaviors (i.e., willingness to help) is moderated by emotional intelligence (Agnoli et al., 2015). However, there is the need of supporting data on the moderating effect of trait EI on the relationship between stress and prosocial behaviors, especially when looking at different types of stressors. Since the effect of the EI on stress-behavior link may vary when people are exposed to diverse stressors at different degrees, we included the EI as a moderator in Study 4 to explore this potential differential effect.

3.1.2 The effect of self-compassion on the relationship between war-trauma exposure and mental health consequences

Being aware of own emotions, accepting and respecting own feelings at times of difficulties is an ability typical to all individuals to some extent. Self-compassion is a construct to describe this characteristic that is known to significantly differ among individuals. Self-compassion is an individual's tolerance and compassion toward oneself when suffering (Neff, 2003). The concept of self-compassion has been studied by different disciplines. For instance, at some of the spiritual conceptualizations, it is described as a three-component construct consisting of attention toward suffering, intentionality regarding suffering, and motivation to alleviate it (e.g., Hofmann et al., 2011). Evolutionists, on the other hand, referred to compassion as an affective experience which is linked with soothing, attachment, and desire to reduce suffering (Gilbert, 2005; Goetz et al., 2010). In psychological research, self-compassion is considered to have a key role in psychological health and consists of three interconnected elements that emerge when the individual is facing emotional suffering (Neff, 2003). These elements include self-kindness (vs. self-judgment), a sense of common humanity (vs. isolation), and mindful awareness (vs. overidentification with suffering). The author describes self-kindness as a tendency to be caring and inclusive toward oneself as opposed to being self-judgmental. Common humanity is the ability to view own experience as a universal one rather than having the sense of being at the center of suffering and having a feeling of isolation. And the mindfulness is characterised as a concrete and calm attitude to the pain contrary to the overidentification with suffering (Neff, 2003). Previous research regarded self-compassion as a multifaceted construct consisting of both positive and negative forms (Gilbert et al., 2011; Muris and Petrocchi, 2017; Neff, 2016). The positive self-compassion (self-kindness, common humanity, and mindfulness) is strongly associated with

beneficial mental health outcomes unlike the negative one (including self-judgement, isolation, and over-identification) which was shown to be related to unfavorable mental health consequences (Gilbert et al., 2011; López et al., 2015). As such, in this dissertation we studied positive self-compassion given its beneficial impact on health. Here we define self-compassion as individual's mindful response to emotional distress when the latter is perceived as a universal experience attributable to human beings, and it is related to self-kindness rather than self-criticism (Neff and Dahm, 2015).

One of the reasons we studied self-compassion for this work, is the fact that it is an individual characteristic that was recently shown to be modifiable when applying a targeted intervention (Beaumont et al., 2012; Neff and Germer, 2013; Kearney et al., 2013). For instance, compassionate mind trainings on trauma-related symptoms were conducted with trauma exposed individuals and posttreatment increases in self-compassion were reported (Beaumont et al., 2012). Similarly, Neff and Germer (2013), conducted a mindful self-compassion program and found increased self-compassion in the intervention group (relative to the control one) along with the decreases in depression, anxiety, stress, and avoidance symptoms. These findings are supported by the work conducted by Kearney et al. (2013), who designed a loving-kindness meditation course aimed at improving feelings of compassion and kindness for self and others for veterans with PTSD. They found increases in self-compassion and decreases in PTSD symptoms after the treatment and at follow up; and changes in self-compassion mediated the reduction in PTSD symptoms. A huge body of evidence reports that self-compassion may be an important factor when studying several mental health problems. For instance, previous research reports a strong negative association between self-compassion and the symptoms of depression, anxiety, and PTSD (MacBeth and Gumley, 2012; Neff, 2012; Thompson and Waltz, 2008; Kearney et al., 2013). Self-compassion is generally

believed to be linked to the broad range of outcomes related to psychological well-being (Neff, 2003; Neff & Germer, 2013).

Self-compassion has been systematically studied in trauma research and several longitudinal studies report that self-compassion, psychological flexibility and mindfulness have a long-term effect on PTSD symptoms (Bryan et al., 2015; Call et al., 2015; Hiraoka et al., 2015; Zeller et al., 2015). Moreover, self-compassion was reported to have a positive effect on post-traumatic recovery, and personal growth (Kaplan, 1986). In particular, the capability of accepting the suffering as a part of common human experience may help trauma exposed people gain insight from expressing their thoughts and feelings, in that way re-evaluating the experienced disaster, and so, demonstrating post-traumatic growth (Tedeschi and Calhoun, 2004). In fact, the link between self-compassion and post-traumatic growth has been well-documented (Wong and Yeung, 2017). Several studies reported the protective effect of self-compassion after the exposure to war trauma as well. For instance, Kearney et al. (2013) showed a negative association between self-compassion and PTSD symptom severity in a sample of war veterans with PTSD. Similarly, Hiraoka et al. (2015) showed that greater self-compassion was associated with lower PTSD symptom severity in combat veterans.

Hence, the protective effect of self-compassion against war-related negative health outcomes has been reported, mainly focusing on veteran samples. However, it is unclear whether these findings can be generalised to the war-exposed general populations, and little is known about the populations like Armenians which constantly face combat situations. Moreover, there is the need of better understanding at what phases of post-war periods the potential protective effect of self-compassion starts to be present. Therefore, to address these critical aspects, we included self-compassion as a possible moderator of war exposure-mental health link in Study 1.

3.2 Stress outcomes and environmental factors

In addition to the individual characteristics, discussed above, the environmental factors are also important to consider when studying the psychological consequences of stress and related behaviors. Several environmental and external factors can potentially be involved in how stress exposed people adjust and behave. For instance, cultural and ethnic values or religious beliefs may strongly influence how individuals perceive stress and react to it. This may be particularly relevant when the stressful event represents a potential threat for a given cultural group, as it often happens in armed conflicts and wars. The socio-political context is another factor that may influence one's appraisals when exposed to one or more sources of stress related to military conflicts. Socioeconomic status can also transactionally influence the stress response of people having different educational background, financial security, and social status. However, the way individuals perceive the environment is indeed linked to a number of other factors such as individual characteristics and previous experiences. In line with this notion, one of the well-studied environmental factors that interacts with individual experiences and perceptions, which can affect stress outcomes is social support.

Humans are a social species and as such continuously interact with the environment and the network of people they are surrounded by, including family, friends, co-workers, or neighbours. Social interactions and support are a key part of our environment which is especially important when we are facing life challenges or stressful events. It is believed that social support is one of the strongest factors related to the ability to adaptively cope with stressful situations (e.g., Cohen and Wills, 1985; Cohen et al., 2000) and through buffering stress it may also reduce stress-conditioned maladaptive behaviors such as alcohol use (e.g., Kelley et al., 2017; Steptoe et al., 1996). Social support may be a moderator of the stress - outcome link, yet the direction of this moderation may vary depending on several factors that I will discuss further.

3.2.1 Social support as a possible protective factor against negative outcomes of stress

It is undoubtable that we all are social beings that rely on the interaction and cooperation with others to survive and thrive. On a daily basis, we interact with our family, work with the team or we communicate with our friends and, more importantly, sometimes turn to our significant ones in case of difficulties. Having healthy social interactions is the basis of well-functioning societies and the psychological well-being of the individuals living within it. Thus, it is not surprising that studying the dynamics of social interactions and, in particular, receiving help from others at times of challenges have been the objective of previous research on stress, health and behavior. It was shown that having social support when facing stressful situation can buffer the negative impact of stress and may lead to favorable health outcomes through effective coping (Cohen and Wills, 1985; Cohen et al., 2000). In this work, social support is characterised as people's perception or experience of being cared for by others and having a reliable network to turn to when needed (Taylor, 2011). Important sources of social support may include family, friends, and the community (Lin et al., 2013). Family comprises one's immediate family members like a spouse, children, and parents, as well as extended family members or relatives who may live in another household. People can get social support also from friends they see regularly or from those they communicate time to time. Finally, the community can include friends, neighbours, acquaintances, or contacts in other social networks, such as the workplace, educational institutions, or churches.

Interestingly, it has been shown that the perception of social support, that is one's anticipated access to potential social support, is likely to be protective against stress and may have a greater beneficial impact on health relative to the actual received social support (Kaul and Lakey, 2003; Uchino, 2009). Wethington and Kessler (1986) state that perceived social

support measures provide information on people's evaluation on a hypothetical situation in which support might be needed. While through received-support measures people report on support that had actually been provided in the past. It is believed that people's perception that others can provide emotional support may help them re-evaluate the potential harm of a stressor and available copings abilities which can lead to the appraisal of the event as less psychologically distressing (Cohen and Wills, 1985). So, even though received support is also partly perceptual, given it is based on self-report, it seems like perceived social support has a significant stress buffering effect as compared to the actual received one (Wethington and Kessler, 1986).

The effect of social support as a resource for well-being has been investigated both by evaluating the main effect of social support on mental health and by assessing its stress-buffering effect. The main effect models suggest that social support has a direct beneficial effect on mental health, irrespective of stress exposure, that is, the higher levels of social support are associated with the lower levels of psychological distress (Cohen and Wills, 1985). The stress-buffering models posit that social support protects mental health through the indirect pathway of interaction with the stressor hampering the negative effect of stress on mental health (Cohen and Wills, 1985; Wheaton, 1985). Namely, the stress buffering effect is present when high levels of social support attenuate the psychological reaction to stress and prevent its harmful effect on mental health (Kawachi and Berkman, 2001). Overall, the existing evidence supports the notion that social support can protect people against negative outcomes of psychological distress (Chao, 2011; Hefner and Eisenberg, 2009; Wang and Castañeda-Sound, 2008). The previous works studied the effect of social support on traumatic stress as well such as war-related trauma. It has been shown that perceived social support in the aftermath of war or armed conflict may reduce both short- and long-term mental health symptoms (Hunt and Robbins, 2001; King et al., 1999). For instance, Hunt and Robbins

(2001) studied a sample of the World War II veterans and reported that social support was an important source of coping when dealing with trauma-related symptomatology both during the war and in the years afterwards. Additionally, social support, through its stress-buffering effect, may reduce stress-related malfunctional behaviors as well. Namely, protective effect of social support against stress-motivated alcohol use has been constantly reported. Recent studies found that social support decreased stress-potentiated alcohol drinking (e.g., Kelley et al., 2017). Similarly, Steptoe et al., (1996) showed that, at stress exposures, having high number of supportive people was related to low amount of alcohol use. Together these findings suggest that social support may be an important moderator of stress and health and related behaviors and can protect individuals from adverse stress effects and dysfunctional ways of coping (like alcohol consumption) by acting as an adaptive coping mechanism critical for buffering stress. Therefore, we considered social support as a possible protective factor in Study 2 and 3.

However, it is worth considering that even though social support can be an adaptive and healthy way of coping during and after stress it may not always buffer stress-related drinking. Rather, it has been shown that social support may promote alcohol dinking depending on its type (e.g., Platt et al., 2010). There is data reporting that the source of social network people has may differently impact drinking behaviors. For instance, Platt et al., (2010) showed that while having close friends living nearby can decrease alcohol drinking, socializing with neighbours may increase it. It is well-known that the type of social network from which people receive support may vary by sex (Homish and Leonard 2008). That is, men are more prone to have drinking buddies and friends that are supportive of alcohol-related activities than women (Borsari and Carey, 2001; Homish and Leonard, 2008). Thus, it is possible that depending on sex the source of social support may vary, and, consequently, the effect of social support on stress and alcohol use link may be differently manifested in women and

men. Hence, in Study 3 we tested this sex-related differential moderating effect of social support.

3.2.2 The effect of ethnic identity on mental health symptoms after war exposure

Culture and ethnicity are essential components of individual's identity affecting the way of thinking, behaving, or making decisions at certain situations as well as people's attitudes towards themselves and others. The way people relate to their ethnic and social groups in the aftermath of stressful and traumatic events has been studied by stress research given many of the norms, values, and beliefs about trauma and loss may be determined by cultural elements. In particular, ethnic identity, that is an important element of social identity, may influence individual's perceptions, beliefs and appraisals in general and at times of challenges. In this dissertation we refer to ethnic identity as individual's sense of belonging to a particular ethnic group and a specific part of person's perceptions, thinking, feelings and behavior resulting from ethnic group membership (Rotheram and Phinney, 1987).

In the literature ethnic identity and racial identity are used interchangeably. According to sociologists, race encompasses groups who share similar physical attributes while ethnicity describes groups who share similar values, norms, customs and language. In this work we use the term ethnic identity given we studied this construct only for one specific ethnic group, that is Armenians.

Ethnic-racial identity is a multidimensional concept comprising two main factors. First component is the content, which includes beliefs and attitudes about ethnic-racial membership. The second component is the process, referred to as the mechanisms by which people explore, form, and maintain these beliefs and attitudes about ethnic-racial membership over time (Umaña-Taylor et al., 2014). It is believed that the process of identity development

may differ by ethnic groups influencing the general beliefs, views and perceptions of a given group (Sue et al., 2022).

Phinney (1989) conceptualize ethnic identity as a process that occurs across the lifespan. Within this framework the identity is viewed as group nonspecific, rather it is focused on the similarities in how individuals can connect with and explore their ethnic identity. Phinney (1989) suggested a three stage model of ethnic identity development which has roots in theories of ego identity formation (e.g., Marcia, 1966). According to Phinney (1989), the stage of *unexamined* ethnic identity starts from the young ages of individuals when they do not think deeply about their identity and internalize aspects of their unique ethnic group without questions. In the *exploration* stage, individuals start to explore and gain more knowledge about own and other ethnic groups which further helps them create their own ethnic identity. Finally, individuals may enter a stage of *achieved and committed ethnic identity* in which they strongly identify with an ethnic group. It is worth noting that people can cycle through each stage at different times across the lifespan and may also return to earlier stages depending on life circumstances. While the process of ethnic identity development may generally be similar across ethnic groups, there may be individual and ethnic group variability in specific features of each stage. Overall, it can be concluded, that the formation of ethnic identity occurs through the interaction of several environmental and individual factors.

It is widely agreed that having strong sense of ethnic identity can be related to positive outcomes in terms of well-being (Smith and Silva, 2011). The previous literature reports that individuals who have strong ethnic identity tend to higher levels of self-esteem and positive coping styles as well as they may have less anxiety and depression (Gray-Little and Hafdahl, 2000; Phinney and Chavira, 1992; Roberts et al., 1999; Umana-Taylor et al., 2002). While ethnic identity has been referred to as a factor related to favorable outcomes promoting

adaptive coping styles, the meta-analysis data reports that the protective benefits of ethnic identity may not always extend to mental health symptoms and the relationship between ethnic identity and mental health symptoms may not be as strong as it is believed (Smith and Silva, 2011). The self-determination theory (Ryan & Deci, 2003) suggests that a stronger connection to own ethnic group can help individuals internalize culturally appropriate views and coping strategies that may be helpful at times of stressful and traumatic situations. In fact, prior research has systematically studied the effect of ethnic identity on the response to stress and trauma and related psychosocial outcomes, however, the findings are mixed and there are discrepancies reported. For example, there findings suggesting that stronger ethnic identity may be related to more PTSD symptoms after trauma exposure. For instance, Khaylis et al. (2007) found that after the exposure to race-related stress, individuals with strong ethnic identity reported more PTSD symptoms. On the contrary, studies addressing other types of traumatic stress did not find any association. For instance, Kaur and Kearney (2013), demonstrated that among young individuals who were exposed to maltreatment there was a non-significant association between ethnic identity and PTSD symptom severity. Taken together, these findings suggest that having strong ethnic identity may be related to adaptive outcomes in terms of well-being, however its effect on mental health symptoms after stress exposure is unclear, given the findings vary. Additionally, further research is needed to study how ethnic identity may influence the psychological response to specific traumatic events potentially related to ethnicity, such as war, especially targeting ethnic groups (like Armenians) that have not been well-addressed by previous studies, as we tried to conduct in Study 2.

The main goal of this dissertation

For this dissertation we aimed at studying the effect of different sources of stress, in terms of type, degree, nature of event (from micro to traumatic) and duration on mental health and behavior considering the possible moderating role of individual (i.e., emotional intelligence and self-compassion) and environmental factors (i.e., ethnic identity and social support).

In particular, we conducted Study 1 following the 2020 Nagorno-Karabakh war on a convenience sample of 349 civilians. The goal of this study was to explore how the exposure to traumatic stress, such as war, was related to mental health symptoms (i.e., PTSS) shortly after the event and later; and how the individual characteristics like emotional intelligence and self-compassion moderated the war-PTSS link at different phases of post-war adjustment.

We conducted Study 2 within the same population and aimed to explore the psychological impact of war on civilians by examining the direct and interactive effect of environmental factors like perceived social support and ethnic identity on post-traumatic symptomatology after the war. The Study 3, that resulted as a part of collaboration with Yale University (Yale Stress Center), comprised a community sample of 462 adults. The objective of this study was to explore how the quantity and the severity (i.e., event duration) of stressful and traumatic life events that people have recently had may influence the maladaptive behaviors such as alcohol use; and how the environmental characteristics like social support moderate stress-alcohol use link in women and men considering sex differences.

Finally, Study 4 was an experimental study on a sample of 400 undergraduate students. This study aimed at exploring how different types of experimentally induced stressors (i.e., social, emotional, cognitive), experienced at different degrees, may affect adaptive, prosocial behaviors (like willingness to help and donation); and assessing the potential moderating role of an individual characteristic such as emotional intelligence on stress-prosocial behavior link

after the exposure to different types of stressors. It should be noted that this study was originally designed for the lab (and should have included physiological indexes registration) but due to COVID-19 it was conducted on-line.

CHAPTER 4

In this part of the dissertation I will present a research that we conducted right after the war that happened on September 27, 2020 over the disagreement between Armenia and Azerbaijan on the status of Nagorno-Karabakh territory. Nagorno-Karabakh is a disputed territory which is located near to the south-eastern part of Armenia. It is inhabited primarily by Armenian population. There has previously been a number of conflicts between Armenia and Azerbaijan over the contested territory of Nagorno-Karabakh during the past 30 years. As a result, several wars and skirmishes happened with devastating outcomes in terms of deaths, destructions, and territorial losses from both sides. The 2020 Nagorno-Karabakh war was unexpected though, it erupted rapidly early in the morning causing panic and being a source of severe stress among civilians. Thus, we conducted a research on the psychological consequences of this disastrous source of stress that will be presented below.

Study 1

Traumatic stress symptoms in civilians after the 2020 Nagorno-Karabakh war: the protective role of self-compassion and emotional intelligence

(Hovnanyan, A., Vardanyan, N., Moscardino, U., Olff, M., & Scrimin, S. (Under review). Traumatic stress symptoms in civilians after the 2020 Nagorno-Karabakh war: the protective role of self-compassion and emotional intelligence. *Transcultural Psychiatry*.)

4.1 Abstract

Exposure to war is linked to negative mental health outcomes. Self-compassion and emotional intelligence may foster post-war adjustment processes differently depending on the time since the event happened. This study explores post-traumatic stress symptoms (PTSS) in civilians exposed to the 2020 Nagorno-Karabakh war shortly after the war, and after 6 months had passed since the conflict ended, and investigates the potentially protective role of self-compassion and emotional intelligence in the expected war exposure-PTSS relationship. War-exposed civilians were asked to self-report on their PTSS, self-compassion and trait emotional intelligence at two phases. Results showed greater PTSS shortly after the war as compared to 6 months after the war ended. Lower self-compassion scores were related to more PTSS at the first phase, whereas lower emotional intelligence was associated with more symptoms 6 months later. These data demonstrate how war-exposed Armenian civilians coped with war by revealing time-specific effects of two individual characteristics that may promote better mental health consequences after the war exposure. The findings indicate that as the post-war adjustment process unfolds, individuals benefit from different resources at different phases. Specifically, self-compassion may be a protective factor shortly after the

war, whereas emotional intelligence may protect individuals against having adverse health outcomes later on.

Keywords: War trauma, Post-traumatic stress symptoms, Mental health, Protective factors, War exposed civilians

4.2 Introduction

Wars have disastrous consequences. In addition to the dramatic loss of human lives, territorial destruction, and economic crisis, wars have massive negative psychosocial impact.

As a source of potential traumatic events, war exposure can lead to severe mental health problems (Steel et al., 2009, Yousef et al., 2021).

On September 27, 2020, Armenia was hit by a dramatic 44-day war that broke out over the disagreement between Armenia and Azerbaijan about the status of the Nagorno-Karabakh territory. Nagorno-Karabakh is a contested territory located near the south-eastern part of Armenia, which is inhabited and governed primarily by Armenians. The conflict resulted in over 5000 casualties and thousands being injured (Losh, 2021). The population of Nagorno-Karabakh was directly exposed to artillery and drone attacks and, by the end of the war, around 60% of the population was displaced throughout Armenia, mainly in the capital Yerevan (Bagirova and Hovhannisyanyan, 2020). Despite the huge devastation, there are no published data on the effects of the Nagorno-Karabakh war on civilians' mental health. However, recent findings on other conflicts show a high prevalence of post-traumatic stress symptoms (PTSS) within a year of exposure (e.g., see data on the 2018 Gedeo–Guji conflict in Ethiopia; Madoro et al., 2020). High rates of PTSS were found among Kosovo civilians who reported high frequency of exposure to combat situations after the organized violence and war in the region (Eytan et al., 2004); and Stevanović et al. (2016) showed that exposure to war-related trauma was associated with high levels of posttraumatic stress disorder (PTSD) symptoms among civilians of the Croatian war. Not only direct, but also mediated war exposure can severely impact mental health (Silver et al., 2013; Thabet et al., 2014). During the 2020 Nagorno-Karabakh war, the active fighting took place along its territory and border, but people living in Armenia were exposed to war-related stress by having their family members on the front line and/or supporting displaced individuals. Life dramatically changed

because of war, and the exposure to combat-related stimuli such as sounds and scenes was severe. Cases of drone surveillance and actions of missile defense systems were reported outside of the war zones, including the capital of Armenia. Moreover, pictures and videos of mutilated bodies were constantly broadcasted via the (social) media.

Although direct and indirect exposure to organised violence and armed conflict are among the strongest factors predicting impaired mental health (Liu et al., 2017; Murthy and Lakshminarayana, 2006; Scoglio and Salhi 2020; Steel et al., 2009), variability exists in how trauma-exposed individuals psychologically respond to such events, with some people developing severe mental disorders (e.g., PTSD), and others adjusting and functioning well (Masten et al., 1990). Moreover, some people who initially develop psychological symptoms can recover without any specific intervention, emphasizing the importance of studying potential individual and contextual factors that may explain positive adaptation after trauma exposure and posttraumatic growth.

Resilience is the capacity of a dynamic system to adapt successfully to challenges that threaten the function or survival of the system itself (Masten, 2021, Southwick et al., 2014). It can be considered as a trajectory of ‘relatively stable, healthy levels of psychological and physical functioning’ in the aftermath of potentially traumatic events (Bonnano, 2021). About one third of people do not show such a resilient trajectory while it is yet unclear what factors moderate these trajectories (Galatzer-Levy et al., 2018).

The degree of exposure to traumatic events is an important factor to consider in trauma-health outcomes relationship. Previous data show that more extreme exposure to adversities can be associated with more problems and less favorable adaptation (Masten et al., 2015). For instance, greater exposure to destruction, loss or injury, displacement or separation from the family is typically associated with more PTSS and disturbances in functioning. Hence, during

and after war, individuals may be at risk based on their exposure degree, challenges and changes experienced in their life (MacDermid et al., 2008).

Successful adaptation following traumatic event exposure (Luthar, 2006) has also been linked to specific individual characteristics. In particular, emotion regulation and self-compassion may have a protective role in response to war exposure (Masten, 2018). Trait emotional intelligence (EI), also referred to trait emotional self-efficacy (Petrides et al., 2007; Sevdalis et al., 2007), comprises a constellation of emotion-related self-perceptions located at the lower levels of personality hierarchies and integrates personality's affective aspects (Petrides et al., 2007). Research has found that in stressful situations, high levels of trait EI are linked to higher levels of self-efficacy and the tendency to evaluate the situation as more of a challenge than a threat (Mikolajczak and Luminet, 2008). Furthermore, trait EI has been found to promote adjustment after a highly distressing event by maintaining joy and reducing sadness, shame, and anger (Mikolajczak et al., 2008). Thus, previous research shows that individuals with high levels of trait EI may be less likely to develop PTSD because of their tendency to evaluate trauma less negatively. In line with this, Stough et al. (2009) reported that people with higher (vs. lower) levels of EI tend to have fewer PTSD symptoms. Moreover, the ability to regulate emotions, which is the foundation of EI, has been linked to posttraumatic growth (Li et al., 2015; Sadeghpour et al., 2021); and a correlation between EI and posttraumatic growth has been found (Tuck and Patlamazoglou, 2019). However, even though high scores on trait EI have been linked to effective abilities to cope with stress and environmental demands (e.g., Salovey et al., 2008), little is known about how trait EI influences one's response to war-related traumatic stress. Moreover, the extent to which EI may help individuals cope with war-related traumatic stress and its potential protective role at different post-war phases remains unexplored.

Self-compassion is considered one of the protective factors against mental health problems when facing combat-related stress. According to Neff and Dahm (2015), self-compassion is an individual's mindful response to emotional distress when the latter is perceived as a universal experience attributable to human beings, and it is related with self-kindness rather than self-criticism. Recent findings suggest that greater self-compassion is associated with lower disability in terms of PTSD symptoms and better quality of life in the aftermath of war (Meyer et al., 2018). Hiraoka et al. (2015) showed that higher self-reported self-compassion among US Iraq and Afghanistan war veterans was related to lower PTSD symptom severity. Yet, it is unclear whether these findings can be generalised to the war-exposed general population and, more importantly, whether the potential protective effect of self-compassion is present shortly after the exposure or later.

In the present study, we examined the effects of the 2020 Nagorno-Karabakh war on a convenience sample of 349 civilians. The main goals of this study were as follows: 1) to assess the extent to which war exposure affected civilians in terms of post-traumatic symptomatology shortly after the event and later, while controlling for degree of exposure. 2) To investigate the potential protective role of EI and self-compassion in the expected association between war exposure and PTSS at two phases. The time when the data collection was conducted included 2 post-war phases slightly different from each other in terms of conflict-conditioned circumstances which is potentially critical for participants' psychological response to war. The first phase was between February and April 2021, that is before 6 months had passed since the war ended (<6M). During <6M phase even though the active conflict was over the socio-political climate in Armenia was still fairly unstable. The second phase was between May and June 2021, which is after 6 months following the ending of conflict (>6M) when war-related issues and the environment were relatively stable.

4.3 Methods

Participants

This study comprised 349 civilians (67.33% female) with a mean age of 29.7 years ($SD = 8.48$) living in Armenia during the war. To meet inclusion criteria, participants had to be (1) 18 years or older, (2) physically in Armenia during the war and the data collection period. Six subjects were excluded from the analysis because of not meeting the first criterion.

Participation was voluntary, and no compensation was provided.

Procedure

Data collection was conducted online through the Qualtrics platform between February and June, 2021. The survey was spread by means of a snowball sampling approach. Participants were asked to sign an informed consent form after being presented the study description, including its risks and benefits and their right to withdraw at any moment, without providing an explanation or having any negative consequences. The survey collected data on demographics; individual characteristics (i.e., EI, self-compassion); trauma exposure degree; and traumatic stress symptoms.

Measures

For this study we translated reliable and valid English language measures due to the lack of validated questionnaires for the Armenian population. We followed the translation and cultural adaptation guidelines for cross-cultural health care research proposed by Sousa and Rojjanasrirat (2011). Two independent translators completed the forward translation of the measure from English to Armenian. After comparison of the two versions by a multidisciplinary committee, the chosen version was backtranslated by other two independent translators. Following the committee members' evaluation, the final version was chosen.

Trauma exposure

To measure the degree of exposure to war-related stressors and changes in life as a consequence of war, participants were asked to self-report on several possible sources of war-related stress. They were presented with a list of stressful events and life changes that they might have experienced because of the latest war, and were asked to choose as many options as applied to them. Examples of items included: “loss of a loved one”, “loss of job because of war”, “loss of accommodation as a consequence of war”, or “war-conditioned financial problems”. The cumulative score of war stressors/changes endorsed was subsequently used in the analysis as an indicator of degree of exposure to trauma.

Post-traumatic stress symptoms

To measure PTSS, the standard form of the PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013) was used. The PCL-5 is a 20-item scale measuring trauma-related symptoms. Participants were requested to think about a traumatic experience that currently affected them the most and to self-report on how much they had been bothered by each trauma-related symptom in the past month, from 0 (not at all) to 4 (extremely). Higher symptom severity was defined by higher total scores. A total PCL-5 score over 31 was indicative of clinically significant PTSD. The PCL-5 showed excellent internal reliability ($\alpha = .93$) in the current study.

Trait Emotional Intelligence

This characteristic was measured by a 30-item self-report scale (TEIQue-SF; Petrides, 2009). Participants were asked to self-report on the tendency to perceive, regulate, and express their emotions by indicating how much they agree with the presented statements on a 7-point scale

ranging from 1 (completely disagree) to 7 (completely agree). Higher mean scores defined higher trait EI scores. The internal reliability of the TEIQue-SF was high in this study ($\alpha = .85$).

Self-Compassion

The short form of the self-compassion scale (SCS-SF; Raes et al., 2011) was used to measure participants' self-compassion. This 12-item instrument asked participants to self-report on how they generally act toward themselves in difficult times by indicating how often they behave in a specific manner on a 5-point scale from 1 (almost never) to 5 (almost always). Higher self-compassion capacities were defined by higher mean scores. In this study, the SCS-SF had good internal reliability ($\alpha = .71$).

Statistical analysis

R v. 4.0.3/RStudio was used for the data organization and analysis in this study. We first computed descriptive statistics for the study variables and correlational analyses among time since war ended, war exposure, EI, self-compassion, and post traumatic symptomatology (i.e., a continuous variable of the PCL-5 total score). The time variable was created based on the month of participants' response, namely it was assigned as <6M if it was between February and April 2021 which includes the phase when less than 6 months had passed since the war ended; and the >6M was assigned if the data was collected between May and June 2021, that is when more than 6 months had passed since the conflict was over. Firstly, an independent sample t-test allowed us to compare the reported post-traumatic stress symptoms at two phases; subsequently, a hierarchical linear regression model was used to predict post traumatic symptomatology. The model included, in the first step, time, self-compassion, and EI as predictors while controlling for gender and degree of exposure to war. To assess the

moderating role of individual characteristics, the second step added the two-way interactions between time and self-compassion, and time and EI. If the interaction effect reached significance, we examined the simple slopes of the association between PTSS and individual characteristics at <6M and >6M.

4.4 Results

Descriptive characteristics of participants

Three-hundred fifty-five war-affected civilians participated in this study out of 758 who were invited, representing 46.8% response rate. Six subjects were excluded from the analysis because of being younger than 18 years old. Participants' socio-demographic characteristics are reported in Table 4.1. Sixty-seven percent of participants were female, and the mean age was 29.75 years ($SD = 8.48$). Most participants lived in Yerevan (67.6%), the capital of Armenia, which is located less than 350 km from where the active conflict was taking place.

Table 4.1 Descriptive statistics of socio-demographic and study variables

Age	29.75 ± 8.48	
	18-66	
Gender [%]		
	Female	235 [67.33]
	Male	114 [32.66]
Education [%]		
	Middle school	1 [0.28]
	High school	24 [6.87]
	College	16 [4.58]
	Bachelor	129 [36.96]
	Master	153 [43.83]
	PhD/Specialization	26 [7.44]
Job [%]		
	Service	27 [7.75]

	Office work		13	[3.73]	
	Management		13	[3.73]	
	Information technology		38	[10.91]	
	Finance and banks		12	[3.44]	
	Marketing and public relations		9	[2.58]	
	Tourism		6	[1.72]	
	Health care		28	[8.04]	
	Art		23	[6.60]	
	Other		112	[32.1]	
	Unemployed		67	[19.25]	
Income [%]					
	Low		47	[13.46]	
	Average		189	[54.15]	
	High		28	[8.02]	
	I prefer not to answer		39	[11.17]	
Time [%]					
	<6M		185	[53.01]	
	>6M		164	[46.99]	
Trauma Exposure Type [%]					
	No change		85	[24.35]	
	Financial problems		88	[25.21]	
	Loss of job		13	[3.72]	
	Loss of accommodation		16	[4.58]	
	Loss of a loved one		107	[30.66]	
	Other		154	[44.13]	
Trauma Exposure (cumulative score)					
	Total	Female	Male	<6M	>6M
	1.08	1.12	1	0.99	1.19
	± 0.84	± 0.82	± 0.85	± 0.77	± 0.90
Post-Traumatic Stress Symptoms ([% above cut-off])					
	Total	Female	Male	<6M	>6M
	24.99	28.32	18.12	27.35	22.34

± 18.26	± 17.69	± 17.66	± 16.32	± 19.95
[39.54]	[47.90]	[22.81]	[42.15]	[36.58]

Emotional Intelligence

Total	Female	Male	<6M	>6M
4.97	4.95	5.00	5.02	4.91
± 0.77	± 0.80	± 0.71	± 0.77	± 0.76

Self-compassion

Total	Female	Male	<6M	>6M
3.21	3.18	3.29	3.26	3.17
± 0.62	± 0.64	± 0.56	± 0.65	± 0.57

Descriptive statistics and correlations between study variables

At <6M, 42.1% of the participants reported a PCL-5 score indicative of clinically significant PTSD (probable PTSD, i.e., above the PLC-5 cut-off scores), the rate decreased to a 36.6% at >6M (<6M: below = 107 (57.8%), above = 78 (42.1%); >6M: below = 104 (63.4%), above = 60 (36.6%)). The two groups (i.e., participants with a probable PTSD vs. the other group) significantly differed in terms of self-compassion ($t(353) = 3.36, p = .001$) and EI ($t(353) = 3.88, p = .001$). Participants with a probable PTSD had lower self-compassion ($M = 3.07, SD = 0.58$) and EI ($M = 4.77, SD = 0.71$) compared to those without probable PTSD (self-compassion: $M = 3.29, SD = 0.63$; EI: $M = 5.09, SD = 0.77$). Additionally, the t -test comparing the two phases revealed a significant decrease in PTSS at >6M ($M = 22.19, SD = 19.99$) compared with <6M ($M = 27.48, SD = 16.26$), $t(353) = 2.75, p = .006$. Correlation analysis showed a positive correlation between time and war exposure ($r = .12, p < .019$), and self-compassion was positively correlated with EI ($r = .60, p < .001$).

The role of self-compassion and emotional intelligence in post traumatic symptomatology at <6M and >6M

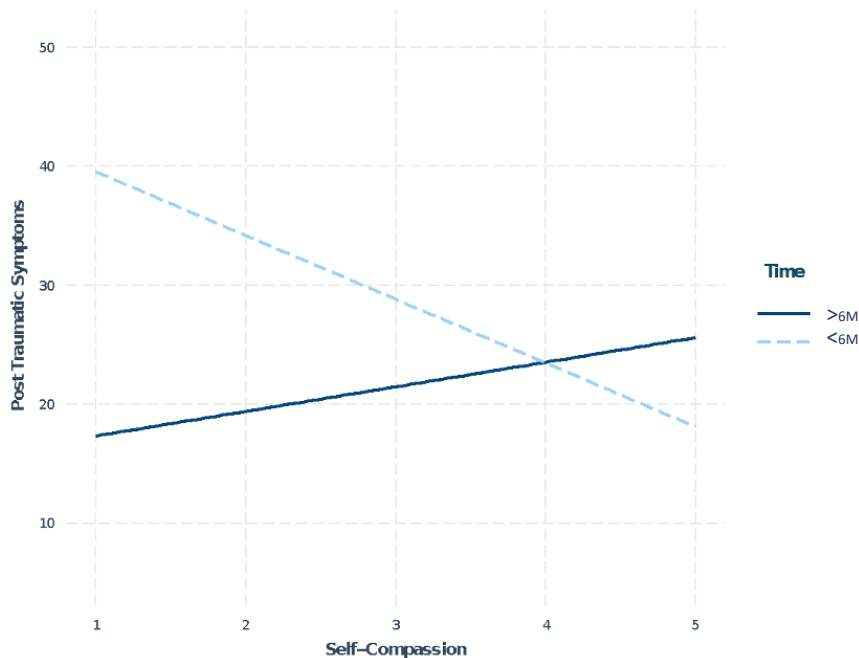
To assess what made people more resilient, a hierarchical linear regression was performed. The first step introduced the main effects of all study variables in the model (i.e., gender, war exposure, time, self-compassion, and EI). In the second step, the interactions between time and the two individual characteristics were added. The model explained 18% of the variance. Results revealed that, as expected, post-traumatic stress symptoms were more present at <6M compared to >6M (Table 4.2). EI was directly and negatively linked with post traumatic symptomatology, indicating that, as expected, greater EI worked as a protective factor. Furthermore, experiencing higher war-exposure was related to more PTSS; and females reported more symptoms than males. Both interaction effects were significant, indicating that self-compassion and EI worked as moderators over time.

Table 4.2 Linear regression model predicting post-traumatic symptoms

Predictor	<i>B</i> (<i>SE</i>)	<i>t</i>	<i>p</i>	η^2_p
<i>Step 1</i>				
Gender (female and male)	-8.06 (1.87)	-4.29	.001	.05
War Exposure	2.09 (1.10)	1.90	.05	.01
Time (<6M and >6M)	-5.75(1.85)	-3.12	.001	.03
Self-compassion	-1.54 (1.85)	-0.83	.40	.001
Emotional Intelligence	-4.57 (1.49)	-3.07	.01	.03
<i>Step 2</i>				
Gender (female and male)	-8.04 (1.87)	-4.29	.001	.05
War Exposure	2.31 (1.09)	2.10	.03	.01
Time (<6M and >6M)	7.40 (12.36)	.59	.54	.03
Self-Compassion	-12.77 (5.74)	-2.22	.02	.003
Emotional Intelligence	6.83 (4.77)	1.43	.15	.03
Time x Self-compassion	7.42 (3.72)	1.99	.04	.01
Time x Emotional Intelligence	-7.46 (2.97)	-2.50	.01	.02

Simple slope analyses revealed that self-compassion was a protective factor shortly after the war, while the effect of EI was significant 6 months later, that is, at >6M. Specifically, the slope of self-compassion was significant shortly after the end of the war (<6M) ($B = -5.36$, $SE = 2.52$, $t = -2.12$, $p = .03$), but not at >6M ($B = 2.07$, $SE = 2.73$, $t = .76$, $p = .45$). As shown in Figure 4.1, individuals with lower self-compassion at <6M reported more PTSS compared to people with higher self-compassion.

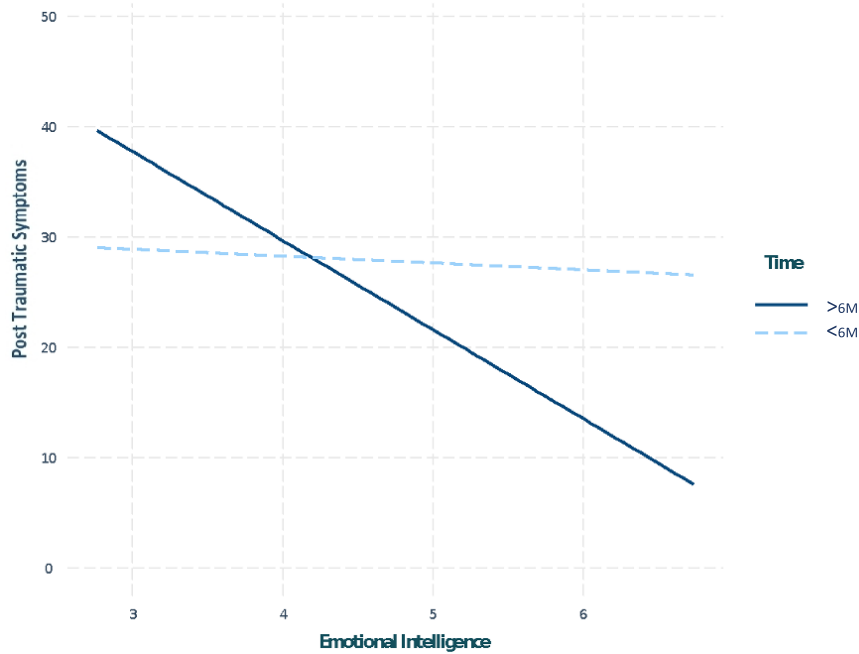
Figure 4.1 Slope analysis for self-compassion as a predictor of PTS symptoms at <6M and >6M



In contrast, the slope of EI was significant 6 months after the war ended, namely at >6M ($B = -8.08$, $SE = 2.05$, $t = -3.95$, $p = .001$) and not at <6M ($B = -0.62$, $SE = 2.15$, $t = -.29$, $p = .77$).

Figure 4.2 demonstrates that individuals with lower EI scores at >6M reported more PTSS compared to the ones with higher EI scores.

Figure 4.2 Slope analysis for emotional intelligence as a predictor of PTSS at <6M, >6M



4.5 Discussion

This is the first study to assess the psychological effects of the 2020 war in Nagorno-Karabakh. We aimed to study the effect of war exposure on civilians' post-traumatic symptomatology shortly after the war, and after 6 months had passed since the conflict was over. The potentially protective role of EI and self-compassion in the expected war exposure-PTSS relationship was also investigated.

Overall, our results revealed that participants had greater post-traumatic symptomatology at the first phase, before 6 months had passed since the war ended, compared to the second one, after 6 months since the war was over. Hence, time since the event was confirmed to be a significant factor associated with PTSS. The decrease of PTSS in our sample 6 months after the event might be explained by natural recovery in addition to the Armenian population's capacity to flexibly adjust to the challenging situations. Consistent with the extant literature,

war exposure degree was also strongly linked to the presence of PTSS at both phases, with higher levels of war exposure being related to more symptoms. Morina et al. (2018) studied civilian war victims in Kosovo and found that trauma exposure was highly associated with post-traumatic and somatic symptoms. Overall, previous research confirms the positive link between degree of traumatic exposure and negative mental health outcomes in terms of PTSD, anxiety, and depression (Do et al., 2019). In line with prior data (e.g., Olf, 2017), women reported more PTSS compared to men.

The present study underlines the importance of individual characteristics showing the protective role of self-compassion and EI. Both variables are associated with lower PTSD symptoms both shortly after the war and 6 months later, contributing to a better mental health consequences. This is in line with previous research showing that greater self-compassion is associated with fewer mental health problems (MacBeth and Gumley, 2012), and that individuals with more EI have fewer mental health issues as compared with those with lower EI who are less resilient (Downey et al., 2008; Hansen et al., 2009), also when exposed to man-made disasters such as wars. For example, in a study on U.S. Iraq and Afghanistan war veterans, Hiraoka et al., (2015) showed that soldiers' baseline self-compassion was negatively associated with future severity in PTSD symptomatology. Moreover, Tuck and Patlamazoglou (2019) found that EI was positively correlated with post-traumatic growth in trauma exposed individuals. Psychological flexibility, mindfulness (which are important components of EI), and self-compassion have been linked to recovery from PTSD symptoms among war veterans (Meyer et al., 2019).

Our findings go beyond the protective effects of self-compassion and EI on war-related PTSS symptoms by showing how their role differs based on time since the event. Specifically, self-compassion was a protective factor shortly after the war ended, whereas EI played a significant role later on. These data indicate that as the post-war adjustment process unfolds,

individuals benefit from different resources at different periods. In the aftermath of a war, the community may face several secondary stressors (Miller and Rasmussen, 2010) that are related to the socio-political climate, the economic consequence of the conflict and the degree of destruction. As a consequence, individuals have to adapt not only to the war trauma, but also to the secondary stressors associated with it. When the Nagorno-Karabakh war ended, the climate across Armenia was characterized by tragic outcomes directly linked to the war, but also by highly stressful socio-political and economy-related changes caused by the conflict, such as political manifestations and protests, sharp decrease in economic resources, and so forth. Within this socio-political climate, people had to deal with both negative affect associated with war consequences and additional stressors related to the uncertainty of the socio-political situation. At this stage, self-compassion might help accepting and respecting one's own emotional states and promote struggling against the inextricable situation and the powerlessness related to the unwanted outcomes of war. Thus, individuals who were more capable of being compassionate toward themselves in terms of accepting their own reactions and trying to focus on activities that help them to feel better reported less PTSS. Differently, 6 months after the conflict ended, the situation within the country had changed. War-related issues and the socio-political environment were relatively stable compared to the past, and people could start to adjust and mobilize personal recourses to reshape the future. At this point, those who were capable of understanding and managing their own emotions, through effective EI skills, adjusted better. As such, the ability to regulate emotions led to less negative symptoms. According to emotional processing theory (Foa and Kozak, 1986), appraisal of responses and behaviors is an important factor in the development of PTSD. That is, self-appraisal of the traumatic event, especially as the adjustment process takes place, may produce a perception of incompetence and a sense of unsafety, which may increase the vulnerability for PTSD.

Furthermore, these individual characteristics might separately have a protective role at different phases due to the fact that at the beginning, individuals still have enough resources for self-awareness of their own emotions and self-kindness, whereas as time passes, self-compassion no longer works as a strategy because of the consumption of personal resources. On the other hand, individuals who have the ability to regulate their emotions, in spite of being in a state of exhausted resources, have less negative symptoms. It is also possible that the effect of EI, that was not significant shortly after the war, started to be relevant when it came to deal with more complex responses (e.g., conscious perception of war-related emotions, need to adapt to the situation) that were present sometime after the war ended as compared to more impulsive, “first affective reactions” to the event, when everything was unexpected and novel and there was a need to respect one’s own emotions and be self-kind. This study has several limitations that are worth mentioning. Because of COVID-19-related restrictions, the data collection was conducted online, which is one of the drawbacks of this work. It is a convenience sample and access to the online survey might have been limited to a specific portion of the population (i.e., medium to high SES individuals with a higher educational degree and easy access to the web), thus limiting its applicability to the population. However, this way of collecting data allowed to reach a fairly high number of participants. Another limitation is related to the lack of validated questionnaires on traumatic symptoms assessment for the Armenian population. Future studies should address this issue by validating self-report measures, including mental health screening tools, for this understudied population.

Regardless of the limitations discussed, this work provides an important contribution to war trauma research. With this study we highlight the importance of time in the aftermath of war as well as of specific individual characteristics and their role at different phases in promoting individuals’ adjustment. This study is the first to investigate how the general population in

Armenia psychologically struggled against the 2020 Nagorno-Karabakh war. Our data showed that two individual characteristics like self-compassion and EI may promote less negative mental health consequences, in terms of lower PTSS. Self-compassion may be a protective factor shortly after the war, whereas emotional intelligence may protect individuals against having adverse health outcomes later on. These findings underline the need to further examine time-specific protective effects of these characteristics with the potential to promote evidence-based interventions which may target self-compassion and emotional intelligence at specific periods after the war.

CHAPTER 5

Study 2

Ethnic identity, social support, and the psychological impact of the 2020 Nagorno-Karabakh war

(Hovnanyan A., Vardanyan, N., Moscardino, U., Olf, M., & Scrimin, S., (To be submitted). Ethnic identity, social support, and the psychological impact of the 2020 Nagorno-Karabakh war. *Journal of Cross-Cultural Psychology*.)

5.1 Abstract

Wars have a significant negative impact on mental health. Ethnic identity and social support may influence the psychological impact of war among Armenian civilians exposed to war trauma. This study explores the effect of war on civilians by examining the direct and interactive effect of cultural and environmental characteristics such as ethnic identity and perceived social support on post-traumatic stress symptoms (PTSS) following the exposure to war. War-exposed Armenian civilians were asked to self-report on their PTSS, ethnic identity and perceived social support after war. The results showed that higher social support was directly related to fewer post-traumatic stress symptoms. Furthermore, we found a significant interaction between ethnic identity and social support; specifically, among individuals perceiving lower social support from friends and family those with higher ethnic identity reported more post-traumatic stress symptoms than those with lower ethnic identity. These findings suggest that social support has a protective role against stress-related negative impact after war exposures. Our data further indicate that when perceived social support is low, Armenians with stronger ethnic identity are more vulnerable and report higher post-traumatic stress symptoms.

Keywords: War trauma, Post-traumatic stress symptoms, Ethno-cultural aspects, Ethnic identity, War exposed civilians

5.2 Introduction

Wars have a substantial impact on mental health, and the consequences affect the population as well as future generations (Carta et al., 2015). Armenian people have a long history of oppression, conflicts, and potentially traumatic stress due to their geographical location but also to their religion and cultural identity.

On September 27, 2020, a 44-day war erupted over the disagreement between Armenia and Azerbaijan on the status of Nagorno-Karabakh territory. Because of this military conflict over 5000 casualties and thousands of injured were reported (Losh, 2021), and almost 60% of the population of Nagorno-Karabakh was displaced throughout Armenia (Bagirova and Hovhannisyan, 2020). Nagorno-Karabakh, also known as Artsakh, is a disputed territory which is located near to the south-eastern part of Armenia. It is inhabited by Armenians who consider themselves having identical ethnicity with the population living in Armenia while also sharing the same language, religion and cultural values. For more than 30 years, ethnic and territorial conflict between Armenia and Azerbaijan over the contested territory of Nagorno-Karabakh resulted in several wars and numerous skirmishes (Klever, 2013). However, the 2020 Nagorno-Karabakh war was unexpected, it had a very rapid onset and despite provoking panic among Armenians was followed by an immediate wave of mobilisation all over the country. Thousands of military volunteers from Armenia joined the front line of the conflict, moreover a number of volunteering activities to gather first necessity goods for soldiers and displaced individuals as well as monetary and blood donations were immediately activated. As a result, even though most of the population of Armenia was not directly facing the warfare they were directly and indirectly exposed to the war stress as well. Indeed, as in most wars, both combatants and civilians faced trauma. The general population faced a number of potentially traumatic events such as having family members fighting in the front, exposure to combat-related sounds and scenes and direct

involvement in supporting actions toward the combatants. Although most of the research on trauma during armed conflicts has focused on the combatants, especially those who served in the armed forces, recently the prevalence estimates of PTSD among all civilian populations exposed to conflict have been reported (Silver et al., 2013; Thabet et al., 2014).

A significant presence of post-traumatic stress symptoms (PTSS) in civilians exposed to the 2020 Nagorno-Karabakh war was registered right after the end of the conflict and, even if in a lower number, 6 months after the war ended (Hovnanyan et al., Submitted). Interestingly, individual characteristics influenced the progress of mental health outcomes. Armenian civilians adjusted to war by drawing strength by different individual resources at different phases. Specifically, self-compassion seemed to be a protective factor shortly after the war, whereas emotional intelligence protected individuals against having adverse health outcomes later on. The psychological response to traumatic stress has been shown to vary not only in relation to individual characteristics (Li et al., 2015; Kearney et al., 2013) but also based on cultural and environmental factors (e.g., Hunt and Robbins, 2001; Khaylis et al., 2007).

Two important constructs combining individual, environmental and cultural aspects are social support and ethnic identity. Both factors have been taken into account by traumatic stress research. Social support is characterised as one's perception or experience of being cared for by others and having reliable people to turn to at times of need (Taylor, 2011). Social support, especially the perceived one (Kaul and Lakey, 2003; Uchino, 2009), is considered a strong protective factor against mental and physical health problems due to its stress-buffering effect and promotion of effective coping (Cohen and Wills, 1985; Cohen et al., 2000). Several studies have shown how perceived social support in the aftermath of war or armed conflict is capable of reducing both short- and long-term mental health problems (Hunt and Robbins, 2001; King et al., 1999). For example, Hunt and Robbins (2001) showed that social support was an important coping strategy to deal with trauma-related symptomatology

both during the war and in the years afterwards on a sample of the World War II veterans. Yet the perception of social support and its relevance within a community might vary significantly as a function of culture. Perception of social support and related expectations may be associated with the cultural values and norms of a given group. Armenian culture is considered as collectivistic, and people are part of strong cohesive groups with strong social and individual ties. A collectivist culture values interdependence and is oriented towards cohesion, commitment, and obligation. In collectivist cultures, social units with common goals are central. Consequently, collectivist value systems are strongly related to communalism (Schwartz et al., 2010) which emphasises social bonds, and prioritises social relationships over individual achievement. In addition, familism that is prioritizing the family (as a social unit) over the individual needs is also very important in these communities (Schwartz et al., 2010). Given that supporting each other and cooperating is of primary importance in collectivistic societies, people may potentially have high expectations from the group (in terms of support), especially those with strong sense of belonging to the group itself.

Ethnic identity is defined as individual's sense of belonging to a particular ethnic group and a specific part of person's perceptions, thinking, feelings and behavior resulting from ethnic group membership (Rotheram and Phinney, 1987). Ethnic identity is a multidimensional construct referred to as one's feelings, daily experiences, and social and interpersonal interactions with others (Steinberg and Morris, 2001). The development of the ethnic identity of Armenians roots back to thousands of years given that this nation exists since antient times. Therefore, it is not surprising that most of them are characterised as having strong sense of belonging to their ethnic and cultural group. The majority of Armenians consider themselves as Christians and are members of the Armenian Apostolic Church. Overall, they are attached to their traditions, cultural heritage as well as their lands. Such strong sense of

belonging might have also been strengthened by the fact that throughout history Armenians have systematically faced the danger of losing their motherland.

It is generally believed that ethnic identity is associated with positive well-being outcomes (Smith and Silva, 2011). For instance, strong ethnic identity has been found to be associated to higher levels of self-esteem and positive coping styles as well as less anxiety and depression (Gray-Little and Hafdahl, 2000; Phinney and Chavira, 1992; Roberts et al., 1999; Umana-Taylor et al., 2002). However, the protective benefits of ethnic identity may not always extend to mental health symptoms. Findings from a meta-analysis on the link between ethnic identity and mental health symptoms showed that the effect size for the strength of such relation was weaker when compared to its relationship with self-esteem and positive well-being (Smith and Silva, 2011). Furthermore, findings on the relationship between ethnic identity and psychosocial outcomes related to traumatic stress varies. For instance, Khaylis et al. (2007) found that stronger ethnic identity was related to more PTSD symptoms. Exposure to specific types of traumatic stress, such as threats toward an ethnic group (race-related stress), may cause a strong ethnic identity to be related to more PTSD symptoms. However, other studies show a non-significant association between ethnic identity and PTSD symptom severity when in the presence of different types of traumatic stress, such as the one experienced by maltreated youths (Kaur and Kearney, 2013). Overall, the existing literature reports inconsistent data on the presence and strength of the effect of ethnic identity on PTSD symptoms after trauma exposure suggesting that ethnic identity may not directly be related to PTSD symptom severity after war, rather a third variable may moderate this relationship. Interestingly, previous research reported a positive link between ethnic identity and social support among different populations. For instance, it was shown that perceived social support (in particular, maternal support) was related to positive feelings about the ethnic group among adolescence population (Caldwell et al., 2002). At the same time, individuals with a strong

ethnic-racial identity are likely to utilize social support to provide comfort (Uba, 2003) when facing discriminatory acts. Additionally, there is some evidence on how this positive relationship may have impact on stress outcomes with limited data in the war context. For example, it has been reported that the positive association between common identification and social support between group members can be related to reduced stress at challenging circumstances (Haslam et al., 2004; Haslam et al., 2005). Taken together these findings suggest that ethnic identity and social support may interact with each other and that during or after stress exposure this transaction can promote a more positive outcome potentially improving stress-related negative impact. However, little is known about the war-related trauma in this relation, with no reported data on war-exposed Armenian population. Data exploring the interactive effect of social support and ethnic identity on post-traumatic stress symptoms (PTSS) among war-exposed populations are scarce.

In the present study we explored the psychological impact of the 2020 Nagorno-Karabakh war on a convenience sample of 349 civilians by examining the direct and interactive effect of perceived social support and ethnic identity on post-traumatic symptomatology after the war while controlling for the degree of exposure. We might expect a negative association between social support and PTSS, as the literature suggests a stress-buffering effect of perceived social support after exposure to potentially traumatic events (e.g., Hunt and Robbins, 2001; King et al., 1999). Given the previous literature reported mixed findings on the direct effect of ethnic identity on PTSS (e.g., Khaylis et al., 2007; Kaur and Kearney, 2013) it is difficult to advance specific hypothesis. Yet, given that Armenians have strong ethnic identity, and such characteristic has been reported to protect against depressive symptoms in immigrant Armenians after genocide we might expect a negative association also with PTSS. Moreover, we might expect a significant interaction between social support and ethnic identity in predicting PTSS. Specifically, it is expected that higher social support

together with strong ethnic identity might have a cumulative effect and overall reduce post-war stress symptoms.

5.3 Methods

Participants

This study was conducted on Armenian civilians who were physically in Armenia during the war. After the exclusion of 6 subjects who were under 18 years old, the final sample comprised 349 civilians (67.33% female) with a mean age of 29.7 years ($SD = 8.48$). Before starting the survey, an informed consent was obtained from the participants after a detailed description of the study procedure, risks, and benefits, and their right to withdraw it at any moment, without explanation or negative consequences. They were informed that the participation was voluntary, and no compensation would be provided. The study was conducted in accordance with the recommendations of the 2013 World Medical Association's Declaration of Helsinki on ethical principles for medical research involving human subjects (World Medical Association, 2013).

Procedure

Data collection was conducted between February and June 2021. The online surveys were spread through the Qualtrics platform by using snowball sampling technique. Participants were requested to complete the surveys assessing demographic information, trauma exposure degree and traumatic stress symptoms, ethnic identity, and perceived social support.

Measures

Trauma exposure and time since the event

To assess the degree of exposure to war related stressors and changes in life because of war participants were asked to self-report on a number of possible sources of war related stress. Specifically, they were asked to choose all the war-related stressors or life changes that they experienced from the presented list including the items like “loss of a loved one”, “loss of job because of war”, “loss of accommodation as a consequence of war”, or “war-conditioned financial problems”. The cumulative score of war stressors/changes endorsed was further used in the analysis as a degree of trauma exposure. In addition, the time variable was created based on the month of participants’ response, namely it was assigned as 1 when less than 6 months had passed since the war ended; and 2 was assigned when more than 6 months had passed since the conflict was over. These two periods were separated given they varied in terms of conflict-conditioned circumstances (e.g., socio-political climate, war-related issues and the overall environment) which may potentially be important for participants’ psychological response to war.

Post-traumatic stress symptoms

The standard form of the PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013) was used to measure PTSS. This 20-item scale assessed trauma-related symptoms. Participants are asked to think about a traumatic event that currently affects them the most and to self-report on how much they have been bothered by each trauma-related symptom in the past month, from 0 (not at all) to 4 (extremely). Higher symptom severity was defined by higher total scores. In the current study, the PCL-5 showed high internal reliability ($\alpha = .93$).

Because of the lack of validated questionnaires to assess PTSS among Armenian population we followed the translation and cultural adaptation guidelines for cross-cultural health care

research proposed by Sousa and Rojjanasrirat (2011) to translate reliable and valid English language measures for this study.

Ethnic identity

The revised version of the Multigroup Ethnic Identity Measure (MEIM-R; Phinney & Ong 2007) was used to assess ethnic identity. The three items asked the participants to self-report on their sense of belonging and attachment to their ethnic group by indicating how much they agree with the presented statements from 1 (strongly disagree) to 5 (strongly agree). Stronger ethnic identity was defined by higher mean scores. The MEIM-R had a high internal reliability ($\alpha = .87$) in this study.

Social support

To measure participants' perceived social support the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988) was used. It is a widely used, 12-item questionnaire assessing individual's perception of social support from others at stressful times and in general. Participants were asked to self-report on the extent to which they agree with the statements from 1 (very strongly disagree) to 7 (very strongly agree). Higher perceived social support scores were obtained by higher mean scores. The MSPSS had a high internal reliability ($\alpha = .92$) in the current study.

Statistical analysis

We first computed univariate descriptive statistics for the variables in the study, followed by overall Pearson correlations between time since the event, war exposure, perceived social support and ethnic identity with post traumatic symptomatology.

To test the direct and interactive effects of social support and ethnic identity on PTSS a hierarchical linear regression model was conducted. The model included, in the first step, perceived social support and ethnic identity as predicting factor while controlling for gender, time since the event and the degree of exposure to war. In the second step, we added the interaction between perceived social support and ethnic identity. If the interaction effect reached significance, we examined the simple slopes of the association between post traumatic symptoms and social support and ethnic identity.

5.4 Results

A total of 355 war-affected civilians participated in the study out of 758 that were invited, representing 46.8% response rate. Six subjects that were younger than 18 years old were further excluded from the analysis. Participants' socio-demographic characteristics are reported in Table 5.1 together with correlations between main study variables. 67 % of participants were female, and the mean age was 29.75 years ($SD = 8.48$). Most of the participants (88 %) considered themselves as Armenian. And 67 % of participants lived in Yerevan (capital of Armenia), which is located around 350 km far from the war zone. The time was negatively correlated with PTSS, and positively correlated with war exposure. A positive correlation was found between ethnic identity and war exposure. Finally, social support was positively correlated with ethnic identity.

Table 5.1 Descriptive statistics and correlation table of main variables

	M (SD)	1	2	3	4
1. Post-Traumatic Stress Symptoms	24.99 (18.28)				

2. Time		-0.14*			
3. War exposure	1.08 (0.83)	0.09	0.12*		
4. Ethnic identity	3.88 (0.84)	0.11	0.06	0.18**	
5. Perceived Social Support	5.15 (1.29)	-0.11	-0.11	0.11	0.12*

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

Direct and interactive effect of ethnic identity and perceived social support on post-traumatic symptomatology

As reported in Table 5.2, the linear regression model showed that in the first step perceived social support had a direct negative effect on post-traumatic stress symptoms. Furthermore, experiencing a higher war-exposure was related to more post-traumatic stress symptoms; and females were reporting more symptoms than males. In the next step, the interaction between ethnic identity and social support was added and the interaction effect was significant.

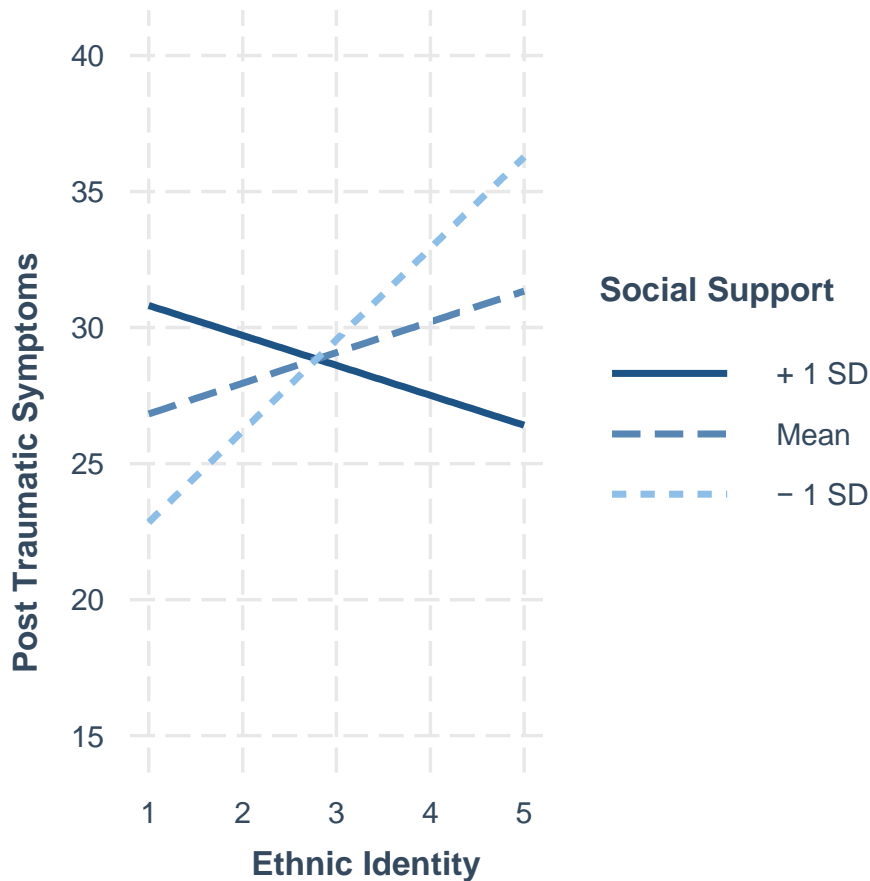
Table 5.2 Linear regression model predicting post traumatic symptoms

Predictor	<i>B (SE)</i>	<i>t</i>	<i>p</i>	η^2_p
<i>Step 1</i>				
Gender (female and male)	-7.83 (1.84)	-4.26	.001	.06
War Exposure	2.79 (1.17)	2.39	.02	.02
Time	1.94 (1.85)	1.05	.29	.003
Ethnic Identity	1.49 (1.06)	1.39	.16	.006

Perceived Social support	-1.82 (0.71)	-2.58	.01	.02
R ²	.13			
<hr/> <i>Step 2</i>				
Gender (female and male)	-7.87 (1.83)	-4.31	.001	.06
War Exposure	2.88 (1.16)	2.48	.01	.02
Time	2.23 (1.85)	1.21	.23	.004
Ethnic Identity	9.95 (4.09)	2.43	.01	.006
Perceived Social support	4.75 (3.15)	1.51	.13	.02
Ethnic Identity x Perceived Social support	-1.69 (0.79)	-2.14	.03	.01
R ²	.15			

Simple slope analyses revealed that the slope of ethnic identity was significant when the level of social support was low ($B = 3.39$, $SE = 1.38$, $t = 2.45$, $p = .01$) but not when it was high ($B = -0.98$, $SE = 1.57$, $t = -0.63$, $p = .53$). As shown in Figure 5.1, individuals with higher ethnic identity and low perceived social support reported greater PTSS as compared to those with lower ethnic identity.

Figure 5.1 Slope analysis for ethnic identity as a predictor of PTS symptoms at levels of social support



5.5 Discussion

This study provides evidence on the effect of the 2020 Nagorno-Karabakh war on Armenian civilians by focusing on the ethno-cultural context of this population for the first time. The main objective of this study was to explore the psychological impact of the war on civilians by assessing the direct and interactive effects of ethnic identity and perceived social support on post-traumatic symptomatology following war exposure.

Our findings on the degree of war exposure and PTSS link are in line with previously reported data. We showed that the war exposure degree was strongly linked to the presence of PTSS among Armenian civilians, with higher levels of war exposure being related to more symptoms, consistent with existing findings suggesting a positive relationship between

traumatic exposure degree and negative health outcomes (Morina et al., 2018; Do et al., 2019). In line with previous literature, we further found that women reported more PTSS relative to men (e.g., Olf, 2017).

The present study revealed that perceived social support had a direct negative effect on post-traumatic stress symptoms suggesting that individuals who perceived social support as high reported fewer symptoms. This data is in line with existing literature, as social support is referred to as one of the primary protective factors against stress-related negative impact, including war stress (Cohen and Wills, 1985; King et al., 1999). In contrast, ethnic identity did not have a significant direct link with post-traumatic symptomatology in our study. The previous works studying the effect of ethnic identity on post-traumatic symptoms reported non-significant associations, similar to our data (e.g., Kaur and Kearney, 2013), but there were also studies showing positive associations (e.g., Khaylis et al., 2007). Our findings on the non-significant direct effect of ethnic identity on PTSS, together with previously reported both consistent and inconsistent data supports the assumption that the effect of ethnic identity may be significant at the presence of a third factor, which, as we showed, may be social support. In addition, ethnic identity might play different roles based on the cultural characteristics of the ethnic group. As previously stated, for example Armenians have a collectivistic culture where a significant value is given to the social group and the well-being of the community.

Interestingly, the current study revealed an interaction effect of ethnic identity and social support on post-traumatic symptomatology of war exposed Armenians. Specifically, among people perceiving low social support ethnic identity worked as a risk factor, that is having a strong ethnic identity while not feeling supported by others was linked with an increased number of post-traumatic stress symptoms after the war. This data supports previous literature reporting that stronger ethnic identity may prompt more negative mental health

outcomes after experiencing events that potentially endanger ethnic or race groups (Khaylis et al., 2007). It is possible that when individuals are exposed to traumatic events that do not represent a threat toward their ethnic group (e.g., youth maltreatment) having strong ethnic identity may not lead to more PTSD symptoms (see Kaur and Kearney, 2013). In contrast, when the event may carry an actual risk for the members of own ethnic group, ethnic identity, cultural heritage and historical lands, like in case of the 2020 Nagorno-Karabakh war, people who have a strong sense of belonging to their ethnic group may respond to trauma in a more negative way, that is greater PTSS. In fact, Armenian people that have previous unfortunate experience of multiple wars and military conflicts, might have perceived this war as a potential threat to their ethnicity, even though not explicitly measured in this study. Most importantly, stronger ethnic identity prompted more PTSS particularly when individuals did not perceive social support from their family and friends. The rationale here might be that when individuals have a strong ethnic identity which is characterized by collectivistic values that emphasises social bonds and prioritises social relationships above individual needs the lack of perceived social support makes them more vulnerable and less resilient after war. Generally, having strong ethnic identity implies a strong attachment to own ethnic group and a profound sense of community relatedness and belonging. Given the collectivistic nature of Armenian society, this attachment may be more strongly manifested among Armenian people. More importantly, those who have strong ethnic identity may give much importance to social interactions with the community and supporting others at stressful times, while also expecting to get support when there is the need. Thus, having a strong sense of community at times of stress with expectations to be supported by the group members, but at the same time not having enough support from others may possibly lead to more negative symptoms.

On the contrary, when high social support was perceived, ethnic identity did not play a significant role. That is, overall high social support was linked with average to low PTSS. Yet, even if the slope of ethnic identity did not reach significance, from a qualitative point of view the trend of the curve indicate that among individuals with high social support ethnic identity worked as a protective factor. People that perceived to be supported by others after the war had less PTSS when reporting high compared with low levels of ethnic identity. This data ones again supports the previously reported protective effect of social support against negative psychological consequences of war (Hunt and Robbins, 2001; King et al., 1999). Furthermore, here we show that when the support of families and friends is perceived as relatively high the presence of high compared to low ethnic identity increases resilience after war. When valuing collectivism and strongly feeling part of their cultural group Armenians benefit the most from the social support they receive.

Overall, these findings support the direct protective role of social support on war outcomes and contribute to the existing literature showing that when perceived social support is low, Armenians with stronger ethnic identity are more vulnerable and report higher post-traumatic stress symptoms. In this study, we targeted Armenian population that is less studied by war research (Phillips and Greene, 2022) by contributing to the general literature with initial evidence on ethnic and cultural aspects of war-related psychological outcomes among Armenians.

This study has several limitations that is important to acknowledge and possibly address by future research. First of all, we studied the effects of war by conducting a study on a specific ethnic group (Armenians). Even though we reported several important findings, it cannot be generalized to other groups given the culturally specific differences. Further studies are encouraged to explore the effect of ethnic identity and social support on war-related PTSS among other ethnic groups, possibly targeting individualistic societies. Second, we did not

have a chance to compare war trauma with other types of traumatic events in relation to the effect of ethnic identity and social support on traumatic stress outcomes. Given different sources of traumatic events may be related to distinct perceptions and appraisals by an individual further studies could explore how ethnic identity and social support could influence the psychological impact of trauma possibly studying the events that are a less likely to trigger a perception of threat toward the ethnic group. Finally, given this study had a cross-sectional design no causal inferences can be made regarding the effect of ethnic identity and social support on war-related mental health outcomes and further longitudinal data is needed.

Taken together, the present study shed light on the existing evidence on ethno-cultural perspectives of war-related mental health impact by adding data on Armenian population. Our findings further suggest that among collectivistic populations, like Armenians, following traumatic events that may carry potential threat toward the ethnic group, people with strong ethnic identity and with not sufficient support from the community may be at risk of developing severe post-traumatic symptoms. This data may have several important implications in the field of prevention and treatment of PTSD after war. Even though replication studies are needed, our data may serve as a starting point for practitioners who try to prevent negative health consequences after war to identify a potential risk group of individuals with strong ethnic identity and low social support. While intervention programs may target social support to improve PTSS of war exposed civilians.

CHAPTER 6

Study 3

Number and duration of stressful events, alcohol use, and social support in women and men

(Hovnanyan, A., Sinha, R., Fogelman, N. (Ready for submission). Number and duration of stressful events, alcohol use, and social support in women and men. *Addiction*.)

6.1 Abstract

Exposure to recent stressors may increase alcohol misuse risk. This relationship may vary by sex and amount of social support (SS), with SS buffering stress and reducing drinking risk. However, there is limited data on how stress amount and intensity impact alcohol consumption as well as how sex and SS moderate these effects. Therefore, this study examined number and duration of recent stress events and SS on alcohol severity, quantity, and frequency, in women and men. We assessed 462 community adults on the number and duration of stressful events, alcohol misuse severity (AUDIT), past month alcohol consumption, and perceived SS. Regression models tested whether stress measures interacted with sex and levels of SS to predict alcohol use variables. Results showed that longer stress duration was associated with more regular alcohol use. More stressful events were associated with greater alcohol consumption. More stress events and longer duration were each associated with higher AUDIT score. Stress intensity interacted with sex and SS to predict AUDIT score: longer event duration with low SS for women or high SS for men predicted higher AUDIT score. Stress amount also had a trending interaction with SS and sex to predict

the amount of alcohol use in the same direction as with the AUDIT scores. As expected, more stressful events and longer duration were associated with more regular problematic alcohol consumption. There were differential moderating effects of SS and sex, indicating that SS buffers stress-potentiated drinking in women, but promotes it in men. These data suggest the need to further explore multiple aspects of stress events and consider sex and SS for their impact on health behaviors.

Keywords: Stress amount and intensity, Alcohol use, Social support, Protective factors, Sex differences

6.2 Introduction

Excessive alcohol consumption can have adverse social, psychological, and medical consequences, including increased risk for mortality (Shield et al., 2014; Rehm et al., 2010). While there are many motivations to drink, people commonly consume alcohol to dampen negative affect. A portion of social and problematic drinkers expect alcohol to relieve tension and stress-related negative emotions (Goldman et al., 1991). The link between stress and alcohol consumption has been systematically studied. Jose et al. (2000) showed that people consume more alcohol during and after stressful life events. Those who abuse alcohol report more stressful life events as compared to non-abusers (O'Doherty, 1991). Stress-motivated alcohol consumption is a matter of concern since it can lead to alcohol use disorder (Sinha, 2008; Sinha, 2012). Stressful events can be experienced at different severities, and the effect of stress on drinking behavior may vary depending on stressor's severity. Even though stress-related drinking is well-studied, little is known about certain aspects of stressful life events (e.g., severity of stressor) in this context, and further explorations are needed.

People face stressful and traumatic events across the lifespan, and the effect of stress that is experienced recently and in the past may be different in terms of health behaviors. Previous research on stress and alcohol use rarely distinguished between recent and past stressful events. One of the few studies showed that recent stressful events, as compared to the past ones, are more likely to be related to unhealthy coping behaviors including binge alcohol use (Hermes et al., 2021). Therefore, it is important to better study the relationship between exposure to recent stressors and alcohol use especially targeting potential protective factors to foster timely interventions. Furthermore, stressful events that people may have can be short-term or long-lasting. For example, events such as natural disasters or serious accidents are naturally related to acute exposures. In contrast, violence, financial difficulties, relationship issues may potentially have long duration. Current literature lacks studies considering stress

duration (referred as stress severity in this work) when assessing stress and alcohol use relationship. Given longer duration of stressful events may be associated to adverse mental health outcomes, in terms of severity of post-traumatic stress disorder (Buydens-Branchey et al., 1990), and behavioral disabilities (Wilson, 2010), studying the effect of stressful event duration on alcohol consumption is critical. While existing evidence on stress and alcohol use is mainly focused on the number of stressful events (e.g., Slopen et al., 2011) and the event type (e.g., Glass et al., 1995; Shaw et al., 2011), we lack knowledge on how stressor's duration affects alcohol use quantity, frequency, and severity.

Exposure to stressful events may be linked to maladaptive coping such as drinking alcohol, but people may effectively cope with stress also by adaptive strategies such as social support (Cohen et al., 2000). While social support is often associated with adaptive and healthy coping during and after stress it may not always buffer stress-related drinking, rather, depending on its type, social support may prompt alcohol consumption (e.g., Platt et al., 2010). Social support is characterized as people's perception or experience of being cared for by others and having a reliable network to turn to when needed (Taylor, 2011). Social support can buffer stress (Cohen and Wills, 1985), and promote effective coping with stressful situations (Cohen et al., 2000). In addition, having high social support may be protective against problematic alcohol drinking (Aldridge-Gerry et al., 2011; Pauley and Hesse, 2009), and the lack of social support may facilitate alcohol use (Borsari and Carey, 2006). Previous research constantly reported the protective effect of social support on stress-alcohol use link. For instance, Steptoe et al., (1996) showed that having higher (vs lower) number of supportive people in the network led to a lower amount of alcohol use during stress. Recent data shows that social support decreased stress-motivated alcohol drinking in US navy members (Kelley et al., 2017). However, depending on the type of social network people have, the effect of social support on alcohol quantity and use severity may vary. For example,

having close friends living nearby may decrease alcohol drinking, whereas socializing with neighbours may increase it (Platt et al., 2010). Moreover, parental support was found to be associated with fewer symptoms of alcohol use and dependence, but peer support was related to more symptoms in adolescents (e.g., Urberg et al., 2005). To date, existing data on the role of social support in stress-related drinking mainly include studies on stress quantity (number of events) and type (see, Jennison, 1992), yet studies directly assessing stress intensity in terms of event duration are rare.

The relationship between stress and alcohol use may vary by sex, and the impact of social support on stress-drinking relationship may be different depending on the type of social support women and men receive. Namely, women report higher rates of traumatic and stressful events (Guinle and Sinha, 2020) and related mental health negative outcomes (Olf, 2017) potentially representing one pathway to problematic drinking more common to women than men (Guinle and Sinha, 2020). On the other hand, it is likely that the effect of stressful life events on alcohol use is stronger for men (Dawson et al., 2005; Veenstra et al., 2006). Therefore, sex can be an important moderator of the stress and alcohol use relationship. Additionally, the type of social networks from which women and men get social support can vary (Homish and Leonard 2008) which is believed to differently influence the impact of social support on stress-drinking relationship in women and men. Overall, these findings emphasize the importance of better studying sex differences in the potential effect of social support on stress-motivated alcohol use.

Although there is a huge body of evidence on positive association between stress and alcohol use moderated by social support, studies to directly assess the specific aspects of stress (i.e., event duration); and to consider sex differences in the effect of social support are rare. Thus, the present study carefully assessed the effect of stressful events' number and duration on alcohol use and the potential moderating effect of social support considering sex differences.

Consistent with previous findings (Sillaber and Henniger, 2004; Blaine and Sinha, 2017; Buydens-Branchey et al., 1990), it is expected that more stressful events, and longer stress duration will be associated with higher rates of alcohol use. It is also expected that higher stress quantity and longer stress duration together with low social support will be associated with higher alcohol use rates, (Cohen & Wills, 1985; Kelley et al., 2017) unique to women compared to men (Maxwell et al., 2022).

6.3 Methods

Participants

A community sample of 462 adults between the ages of 18 and 61 ($M = 29.53$, $SD = 9.07$) were enrolled to assess stress and alcohol use. Participants were recruited through online advertisements on social media, in local newspapers and at community centers in New Haven, CT between 2008 and 2012. Participants were included in the study if they were able to read at the sixth-grade level. Exclusion criteria were: DSM-IVTR diagnosis of substance use disorder (except for nicotine), use of prescribed medications for any psychiatric disorders, pregnancy, chronic medical condition, and traumatic brain injury or loss of consciousness. All the participants provided informed consent to participate, and the protocol was approved by the IRB of Yale. The recruitment and assessment related details are described in previous studies (e.g., Xu et al., 2018).

Procedures

To determine eligibility, potential participants completed an initial telephone screening. Participants were then invited to the Yale Stress Center, where they were consented and completed survey and interview assessments including demographics, information on stressful life events, social support, and alcohol use.

Measures

Recent Stressful Events

The Recent Life Events subscale of Cumulative Adversity Index (CAI; Turner et al., 1995) was used to measure participants' exposure to recent stressors. The CAI is a widely used 140 item semi-structured interview. The 34-item Recent Life Events subscale asks 1) if an event happened to themselves or a close loved one in the past 12 months, and 2) when such an event began and ended. Events are related to death and loss of loved ones, violence, natural disaster, serious accidents and injuries, financial difficulties, issues related to relationship, marital status, work and education. The internal reliability of Recent Life Events subscale was consistent with other studies, and, overall, previous research reported high reliability of CAI and its subscales (e.g., Ansell et al., 2012).

Alcohol Use

To measure the quantity and frequency of participants' unhealthy alcohol use, the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993) was used. The AUDIT is a 10-item frequently used instrument assessing the severity of drinking and hazardous alcohol use as well as the psychological impact of drinking (e.g., feelings of guilt, difficulties in remembering the things). The total AUDIT score is obtained by summing up the scores of each item which ranges from 0 to 40. This scale had very high internal reliability in our sample (Cronbach's $\alpha = 0.89$).

Participants were asked to report on their regular alcohol use by answering a dichotomous (yes/no) question. The frequency and the amount of alcohol use during the last month were

measured by two items on the number of days they drank alcohol and the number of drinks they had in the past 30 days.

Social Support

To assess participants perceived social support, the Interpersonal Support Evaluation List (ISEL; Cohen and Hoberman, 1983) was used. This widely used questionnaire measures individual's perception of social support from others at stressful times and in general. It is a 40-item, dichotomous (true/false) scale. The total score of ISEL is calculated by summing up all the items. The internal reliability of this instrument was very high in this study (Cronbach's $\alpha = 0.87$).

Data Analysis

R v. 4.0.3/RStudio was used for the data organization and analysis in this study.

Demographic data was presented for the overall sample and tested for sex differences using t-tests for continuous variables and chi square tests for categorical ones. Correlation analysis was then performed to measure the relationship between stress, alcohol use, social support, and demographic variables. To have an integrative view of stress and alcohol use link, we studied the effect of stress on regular alcohol use, its amount and frequency in the past month, and alcohol misuse severity. And, in addition to the effect of stress quantity, number of stressful events, we examined the effect of stress severity (i.e., event duration) on alcohol use. To obtain the recent life events total score (stress quantity), the sum of the number of endorsed items was calculated ranging from 0 to 34. To calculate the event duration (stress severity), the sum of the difference between end and start dates was obtained. Then the score was averaged by dividing the sum score by the number of endorsed items for each participant. The final duration score ranged from 0 (no event) to 4 where single 1-day events

were coded as 1, events lasting from 1 to 6 and 6-12 months were coded as 2 and 3 respectively, and the events lasting more than 12 months were coded as 4 (Buydens-Branchey et al., 1990).

To investigate the effect of stress quantity and severity, social support and sex on alcohol quantity, frequency and use severity, regression models tested three-way interactions between stress variables, social support, and sex on all alcohol outcome variables (AUDIT score, regular use, alcohol amount, and frequency in the past month). The models included alcohol use as a dependent variable, stress (event number or duration), social support, and sex as predictors, and interactions between predictors, as well as age and education as covariates. When the interaction effect reached significance simple slopes of the associations were examined. To address multicollinearity issue in all models, stress and social support variables were mean-centered. Square-root transformed dependent variables (AUDIT score) were used to correct for abnormal residuals (i.e., non-constant variance).

6.4 Results

Our total sample consisted of 462 adults (with the mean age of 29.53 (SD = 9.07); 47.6 % female). This sample was predominantly Caucasian (63.4%) who, on average, displayed low-risk alcohol consumption levels (AUDIT score mean = 7.11, SD = 7.44). Men and women did not differ significantly on any demographic, stress, or social support variables (p 's > .518). However, women, on average, had significantly lower problematic drinking scores and less quantity, frequency, and regularity of alcohol consumption in the past month (p 's < .001). Complete descriptive information can be found in Table 6.1.

Table 6.1 Descriptive statistics of study variables

	Female	Male	Whole Sample
	N = 220 (47.62%)	N = 242 (52.38%)	N = 462
	M (SD) / Frequency (%)	M (SD) / Frequency (%)	M (SD) / Frequency (%)
Age	29.49 (9.41)	29.56 (8.78)	29.53 (9.07)
Education	14.91 (2.24)	14.92 (2.27)	14.91 (2.26)
Employment			
Full time	44 (22.45%)	57 (26.03%)	101 (24.34%)
Part time	61 (31.12%)	41 (18.72%)	102 (24.58%)
Unemployed	46 (23.47%)	72 (32.88%)	118 (28.43%)
Never Employed	45 (22.96%)	49 (22.37%)	94 (22.65%)
Race			
Caucasian	126 (57.27%)	167 (69.01%)	293 (63.42%)
African American	56 (25.45%)	53 (21.9%)	109 (23.59%)
Hispanic	20 (9.09%)	11 (4.54%)	31 (6.71%)
Asian	8 (3.64%)	8 (3.3%)	16 (3.46%)
Other	10 (4.54%)	3 (1.24%)	13 (2.81%)
Recent Stressful Events Number	2.93 (2.57)	2.77 (2.56)	2.85 (2.56)
Recent Stressful Events Duration	1.61 (0.64)	1.66 (0.96)	1.63 (0.99)
Alcohol Use (AUDIT)*	5.37 (6.63)	8.69 (7.80)	7.11 (7.44)

Regular Alcohol Use*

Yes	148 (67.58%)	190 (78.51%)	338 (73.32%)
No	71 (32.42%)	52 (21.49%)	123 (26.68%)
Alcohol Use Amount (N of drinks)*	19.98 (41.77)	39.09 (54.55)	29.88 (49.68)
Alcohol Use Frequency (N of days)*	5.25 (6.47)	9.27 (8.61)	7.36 (7.91)
Social Support	33.19 (6.31)	33.22 (6.74)	33.21 (6.54)

*Asterisks indicate significantly different groups: AUDIT score - $t(460) = -4.89, p = .001$; regular alcohol use - $X^2(1) = 7.02, p = .001$; alcohol amount - $t(446) = -4.14, p = .001$; alcohol frequency - $t(460) = -5.62, p = .001$.

Correlation analysis showed a positive relationship between all stress, and alcohol use variables (p 's < .001). Stress quantity and severity were positively correlated with alcohol use amount and regular use respectively, and both stress variables were positively related to alcohol use severity (p 's < .01). Social support was shown to have a negative relationship with stress, and alcohol use variables (p 's < .04). Detailed description of correlation results can be found in Table 6.2.

Table 6.2 Correlation matrix of study variables

	1	2	3	4	5	6	7	8
1. Recent Stressful Events Number								
2. Recent Stressful Events Duration	.45***							

3. Regular Alcohol Use	.03	.13**						
4. Alcohol Use Frequency (N of days)	.03	.07	.40***					
5. Alcohol Use Amount (N of drinks)	.12**	.08	.29***	.71***				
6. Alcohol Use (AUDIT)	.19***	.15**	.40***	.54***	.64***			
7. Social Support	-.17***	-.14**	.05	.01	-.09*	-.17***		
8. Age	.03	.06	.10*	.12**	.10*	.12**	-.18***	
9. Education	-.13**	-.02	.03	.01	-.08	-.16***	.17***	.02

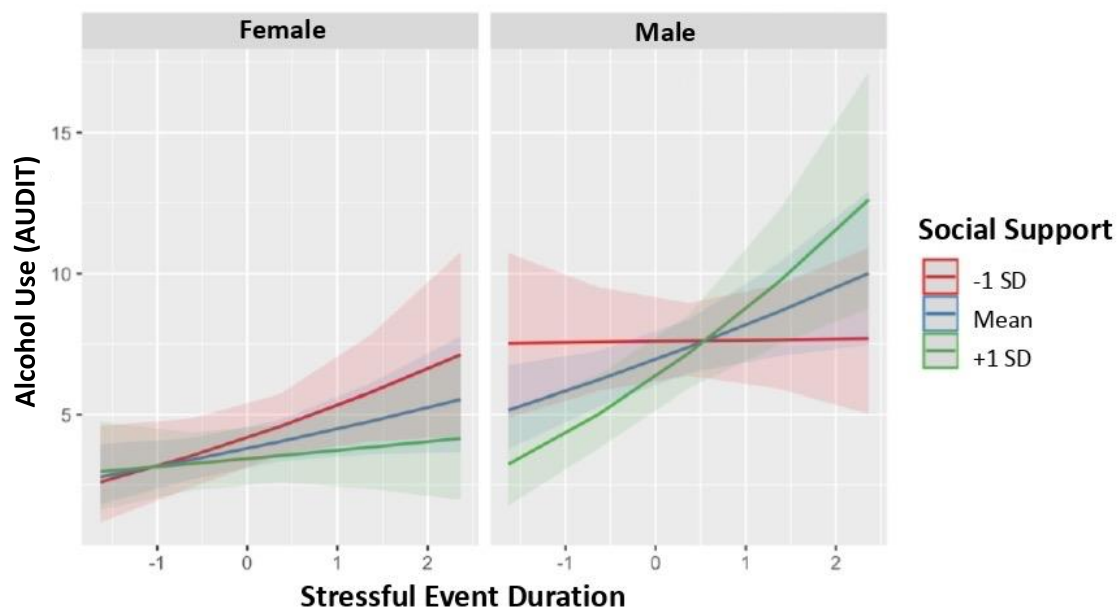
* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Number and Duration of Stressful Events Interact with Social Support and Sex to Predict Problematic Drinking

Results of multiple linear regression models testing whether stress, social support and sex predicted alcohol use severity (AUDIT) revealed that more stressful events ($B = 0.12$, $t = 3.46$, $p = 0.001$), and longer duration ($B = 0.17$, $t = 2.00$, $p = 0.04$) were each associated with higher AUDIT scores. Moreover, stress duration interacted with social support and sex to predict AUDIT score ($F = 5.88$, $p = 0.01$), such that longer event duration with low social

support for women ($B = 0.26$, $t = 2.00$, $p = 0.05$) or high social support for men ($B = 0.44$, $t = 3.62$, $p = 0.001$) predicted higher AUDIT scores (see also Figure 6.1). The slope of stress duration was not significant for women with high social support and men with low social support (p 's > 0.51). Covariates (age and education) were not statistically significant in these models.

Figure 6.1 Simple slope of stressful event duration predicting alcohol use (AUDIT) for levels of social support in women and men



Duration of Stressful Events Predicts Regular Alcohol Use

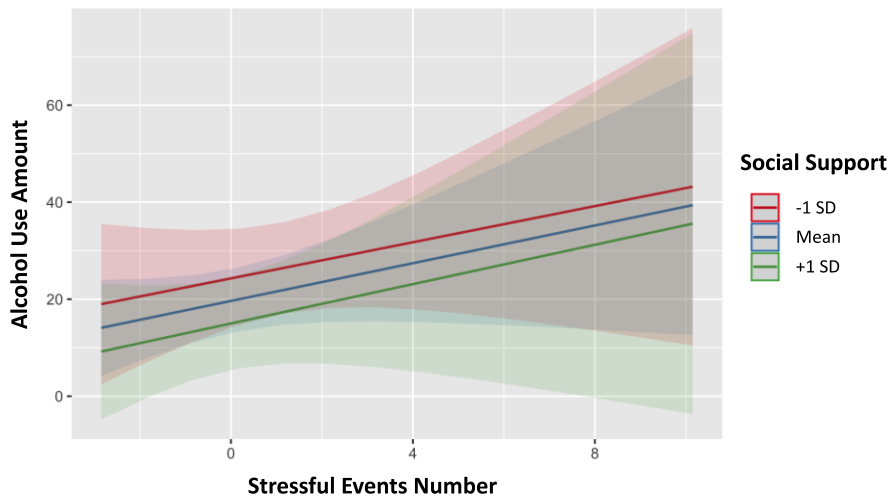
Results of logistic regression models testing whether stress, social support and sex predicted regular alcohol use showed that longer stress duration was associated with more regular alcohol use ($X^2 = 5.28$, $p = 0.02$). Higher age was associated with more regular alcohol use (model with event number: $X^2 = 6.21$, $p = 0.01$; model with event duration: $X^2 = 5.19$, $p = 0.02$).

Number of Stressful Events Interacts with Social Support (and Sex) to Predict Alcohol Use Amount

Results of multiple linear regression models testing whether stress, social support and sex predicted alcohol use amount in the past month showed that higher number of stressful events was associated with higher amount of alcohol use ($B = 2.45, t = 2.69, p = 0.007$). Stressful events number interacted with social support to predict alcohol use amount ($F = 4.19, p = 0.04$) such that more stressful events with high social support predicted higher amount of alcohol use ($B = 4.29, t = 3.22, p = 0.001$) as shown also in Figure 6.2. Additionally, stressful events number had a trending interaction with social support and sex to predict the amount of alcohol use ($F = 3.81, p = 0.052$) with more stressful events in combination with high SS for men predicting higher amount of alcohol use ($B = 6.40, t = 3.45, p = 0.001$). Higher age was associated with greater amount of alcohol use (model with event number: $B = 0.52, t = 2.03, p = 0.04$; model with event duration: $B = 0.52, t = 1.99, p = 0.04$).

Results of regression models predicting alcohol use frequency showed no significant effect of stress and social support variables.

Figure 6.2 Simple slope of stressful events number predicting alcohol use amount for levels of social support



6.5 Discussion

We found a moderating effect of social support and sex on the stress-problematic alcohol consumption relationship. Specifically, women with low social support and men with high social support showed a stronger relationship between stress (both number and duration of recent events) and AUDIT score. While we did not see a significant 3-way interaction with any other alcohol consumption variables, the number of recent stressors by social support and by sex predicting amount of previous month's alcohol consumption was trending at $p < 0.052$, and a 2-way interaction with stressful events by social support was significant. Such findings fit in with the larger literature reporting a positive association between stress quantity and alcohol consumption with social support buffering stress-related drinking in women and prompting alcohol use in stress exposed men (Sillaber and Henniger, 2004;

Blaine and Sinha, 2017; Maxwell et al., 2022; Rapier et al., 2019; Platt et al., 2010; Urberg et al., 2005). Moreover, our findings go beyond the well-studied aspects of stress (i.e., its quantity) and suggest that social support moderates stress-motivated drinking when people are exposed to not only high quantity but also high intensity of stress.

Consistent with previous literature, our results revealed that higher number of stressful events were associated with higher severity of alcohol use and greater alcohol consumption (Sillaber and Henniger, 2004; Blaine and Sinha, 2017). As expected, also longer event duration was linked to higher alcohol use severity and more regular use. These findings indicate that the exposure to both high number of stressful events and long-lasting stressors may represent one pathway to developing problematic drinking behaviors among adults.

Importantly, we showed that stress quantity and severity interacted with social support and sex to predict both alcohol use severity and amount. Our results revealed that longer stress duration with low social support for women or high social support for men was related to higher severity of alcohol use. Similarly, we found a 3-way trending interaction when predicting the alcohol use amount where higher number of stressful events with the levels of social support (again varied by sex) was related to greater alcohol consumption in the past month. Consistently, prior research has reported that the lack of social support may be related to problematic drinking in women as compared to men (Maxwell et al., 2022). On the other hand, Rapier et al. (2019) found that male prisoners are likely to consume more alcohol when having high levels of social support. It is worth noting that these comparable findings on two alcohol use measures that we found contribute to a more comprehensive knowledge on stress and alcohol use link and further support the moderating effect of social support on stress-motivated drinking inversely manifested in women and men.

There can be several plausible interpretations for the observed sex-specific buffering effect of social support on stress-alcohol relationship. One possible explanation may be related to the

source and type of social support women and men get. It is hypothesized that women and men may have different social networks. Namely, men are more likely to have drinking buddies as compared to women (Borsari and Carey, 2001). And, even though women and men have comparable social network size (Westermeyer et al., 2004), the type of network varies by sex, that is men tend to have friends that are more supportive of drinking and related activities compared to women (Homish and Leonard, 2008). As such, since having drinking-supportive social community may strongly influence heavy alcohol use (e.g., Reifman et al., 2006), it is possible that men, that are prone to have drinking buddies, get involved in drinking activities when asking for social support during stress. Overall, our findings support the notion that the source of social network may have a key role in the link between social support and alcohol drinking (e.g., Platt et al., 2010; Urberg et al., 2005). Thus, in addition to studying the role of social support per se on stress-potentiated drinking, future works may consider studying the type of social support men and women receive. Our findings on sex differences in moderating role of social support further indicate that while having supportive social network may buffer stress-motivated drinking in women, it can prompt alcohol consumption in men at stress exposures. Thus, receiving support from others may be protective against alcohol drinking during stress but may also motivate it depending on sex, and potentially based on the type of support women and men receive. Therefore, additional data on the determinants of the effect of social support on stress-alcohol use link is needed which may be an important contribution to the field of evidence-based interventions with the potential to target the level and the source of social support. Most notably, this study examined the impact of different aspects of stress on alcohol use considering the role of social support and sex. While the number of stressful events has been constantly studied in the context of stress, social support and alcohol use (see, Jennison, 1992), we found an effect of stressful event duration as well. Our results suggest that social

support may buffer or promote stress-motivated drinking in women and men when they are exposed to high number of stressful events or to long lasting stressors by shedding light to less studied aspects of stress, such as its duration. With this study we highlight the importance of considering multiple aspects of stress when studying stress and alcohol use link given the strong influence of both stress quantity and its severity on health and related behaviors.

This work has several limitations. First, while we measured the types of social support possibly received, we did not measure who provided the support. Second, even though our measures were widely used and well-validated, the data is relied on the self-reported information and possible over-reliance on memory may bias the results (e.g., quantity of drinks, dates of stressful events happened). Finally, this study had a cross-sectional design. Such a design enabled us to get many, detailed measures on a fairly large sample. However, it did not allow us to make inferences about the long-term effects of stress and social support on alcohol use. Future longitudinal investigations are needed to address this critical aspect.

In summary, the current study contributed to the stress and alcohol use research by revealing that more stressful events and longer duration were each associated with more regular problematic alcohol consumption. Further, social support differentially impacts the stress-alcohol relationship for men and women, such that social support may buffer stress-potentiated drinking in women, but may promote it in men. To our knowledge, this was the first work to systematically study various aspects of stress (i.e., quantity and severity), social support and alcohol use by providing an integrative data of different measures of alcohol use. Given the mental and physical health risks related to stress-motivated problematic alcohol consumption and the importance to explore protective factors against stress-related drinking our data underline the need to further study multiple aspects of stressful events and consider sex and social support for their impact on health behaviors.

CHAPTER 7

Study 4

Stress and Emotional Intelligence Shape Giving Behavior: Are there Different Effects of Social, Cognitive, and Emotional Stress?

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7.1 Abstract

Acute stress has been linked with prosocial behavior, yet it is entirely unexplored how different types of stressors may affect individuals' willingness to help: This is particularly relevant while people is experiencing multiple sources of stress due to the COVID-19 pandemic. Here we explore whether different types of stress influence peoples' giving behavior and the moderating role of emotional intelligence (EI). Undergraduate students were exposed to experimentally induced social, cognitive, or emotional stress and were asked to self-report on their willingness to help and donate to a charity raising funds for COVID-19 and flu patients.

Results showed that when compared to a control condition, after being exposed to a social stress, participants were more willing to help a person in need. Our results also provide evidence that, after experiencing a social stress, participants with high (vs low) trait EI were more willing to help, and, as a result, donated more. Findings indicate that moderate levels of distress are associated with increased donations. Interestingly, when stress is not too threatening, high EI can regulate it and promote prosocial behaviors.

Keywords: Acute stress, Prosocial behavior, Willingness to help, Donation behavior, Trait emotional intelligence

7.2 Introduction

Since ancient times, philosophers have considered the act of one person helping another as the greatest of human values. Indeed, prosocial acts are fundamental features of a healthy and well-functioning society (Nelson et al., 2016; Van Tongeren et al., 2016). It is unquestionable that humans are prosocial species willing to help others. Prosocial behavior is defined as individuals' voluntary intention to serve others at a temporary cost to the self (Eisenberg and Miller, 1987). However, such behaviors are influenced by situational factors (Berger and Rodkin, 2012) as well as how we emotionally respond to them (Lerner and Keltner, 2000). Individuals are constantly exposed to internal demands and environmental sources of stress, that is events that are perceived to be threatening to the self and well-being, which may influence how willing they are to help others.

The possible relation between stress and prosocial behavior has been poorly studied (Von Dawans et al., 2012), for example data are lacking on the effects of different types of stress on willingness to help and donate. Yet, this information is particularly important while humanity is facing a major worldwide health emergency.

Several types of stress fill our daily life and significantly differ one another in terms of how individuals perceive and respond to them. This in turn shapes our behaviors (Starcke and Brand, 2012) including whether we are willing or not to help others (Youssef et al., 2012). A large body of work has investigated the factors that influence willingness to help others (Agnoli et al., 2015), however, the role played by different types of stress has not been studied systematically. Thus, one of the aims of this study is to assess how willingness to help changes depending on the types of stress individuals encounter and the affective reactions experienced in response to them.

Furthermore, stress responses vary significantly among individuals in relation to how effectively they regulate their emotions. The impact of stress on willingness to help has also been found to be moderated by emotional intelligence (Agnoli et al., 2015).

The goal of the present work is to clarify the relationship between different types of stress and emotional intelligence in shaping willingness to help, while considering the exceptional condition imposed by the COVID-19 pandemic¹.

Stress can be defined as an adaptive way to mobilize energy and motivate behavior when facing danger (Sapolsky et al., 2000; McEwen and Akil, 2020) as such we here conceptualize responses to stress in terms of a set of mechanisms (biological and behavioral) that enhance survival and that are mediated by dispositional factors within the individual (Kim and Diamond, 2002). When an individual faces a source of stress a complex set of neurohormonal response will take place together with a general unspecific physiological response that can also be linked with a specific subjective emotional experience (Del Giudice et al., 2018). This complex set of responses are thought to fluctuate based upon the intensity, nature, and duration of the stressor, as well as several internal factors of the individual experiencing it (Joëls and Baram, 2009). The way individuals respond to stressful events is determined by one's perception of the event that can be both unconscious (Porges 2007) and conscious (Lazarus and Folkman, 1984). In addition, the effects of stress on the functioning of the individual follows a nonlinear trend: moderate stress and arousal are often adaptive and can bolster performance, whereas high levels of stress sometimes impair behavioral performance (Yerkes and Dodson, 1908; Sandi, 2013). Some studies have shown that, several factors moderate this relationship. One of these factors is thought to be the type of task, for example tasks that are more cognitively demanding require greater arousal for a better performance (Sandi, 2013). Last, different types of stress may trigger different affective, cognitive, and behavioral responses. Affective response to different stressors influences individuals'

appraisal of the environment or situation, which can lead to different choices or decisions, for example oriented toward or away from others (Lerner and Keltner, 2000).

Recent work in the field of prosocial behavior and charitable giving has shown the central role played by affect heuristic (Slovic et al., 2007). This heuristic affirms that when people make decisions they rely on their affective state (Slovic et al., 2007). So, decisions to help are significantly influenced by contextual factors (e.g., the charity people are asked to support) and people's affective state (e.g., whether they are in a positive or negative mood; Loewenstein and Lerner, 2003). In everyday life, decisions to help others or not are frequently made under stress and this is particularly true during a worldwide sanitary emergency (Mazza et al., 2020). Given the affective response to different stressors may vary it is expected that the prosocial decisions and actions may be partly influenced by the specific affective state induced by each type of stressors. Despite the attempts to study the link between stress exposure and prosocial behavior, in terms of decision to help and donate, data are often conflicting, and several questions remain unanswered. A growing body of literature reports a positive link between exposure to stressful events and prosocial behaviors (Taylor et al., 2000; Wolf et al., 2015); however, there are also data showing a reduction in helping when people are under stress (Vinkers et al., 2013), and the effect of stress, provoked by time pressure or cognitive load, on altruistic behavior was reported to be barely significant (Tinghög et al., 2016; Fromell et al., 2020). In addition, the types of stress (e.g., social, cognitive, and emotional) and the degree experienced (from low to high) can vary significantly and, consequently, may plausibly influence prosocial behavior in specific ways. Different situations or events may induce stress. For example, social evaluation and social exclusion (Kogler et al., 2015) or cognitive stress derived from workload and demanding tasks (Roesch et al., 2002) as well as exposure to emotional cues or situations that evoke negative and stressful emotions (van Stegeren et al., 2008). Each of these types of stress

influences on one's affective state at different levels and challenges the individual in a different way that implies the need to actively respond to restore homeostasis. In the case of a social stress, we may respond through an increased arousal and anxiety when the interaction with others seems to threaten us (Dickerson et al., 2008). Cognitive types of stress can occur when environmental demands are perceived as taxing or potentially exceeding one's own capacity or resources to manage them, such as in complex arithmetic task when a great amount of cognitive effort needs to be used to solve the problem (Van Bockstaele, et al., 2020). Emotional stress is linked with the exposure to highly negative events, cues or even thoughts that cause strong emotional distress and the mobilization of a significant amount of energy to deal with the triggered negative emotions (Mendelson, 2013).

Social, cognitive, and emotional types of stress generate the mobilization of resources that are needed to restore homeostasis; such resources might be linked to different behaviors aimed toward or away from others partly depending on the level of stress experienced (Wolf et al. 2005). In other words, the way an individual respond to a specific source of stress, and how this stress is processed by the mind and body of the individual (see the concept of neuroception proposed by Porges, 2007) may require different amount of energy in order to restore the pre-stressor balance and the selection of different behavioral responses based on a more or less conscious appraisal of the situation. Previous work on the effect of acute stress on willingness to help and donate partially backs our reasoning since, for example some evidence exists about the effect of social and cognitive stress on prosocial behavior (Sollberger et al., 2016; Tomova et al., 2017). For instance, social stress increases the frequency of donation to environmental causes (Sollberger et al., 2016) and Wolf and colleagues (2015) found that being exposed to social stress (TSST) enhanced emotional empathy. Additionally, there is work showing that cognitive stress increases empathy towards others in pain (Tomova et al., 2017). However, there are scant data on the effect of a purely

emotional type of stress on prosocial behavior and to our knowledge there is no data simultaneously exploring the effect of different types of stress on willingness to help and donation behaviors. As a result, one of the goals of the present work is to provide evidence for the effect of emotional stress on willingness to help and donate, while, at the same time, comparing this type of stressor with those that have already been linked to prosocial behavior. Addressing this issue might give practitioners valuable information to select the best contexts in which to maximize people's contributions.

Large variability exists in how an individual reacts to stressors as well as how the same person reacts to different stressors since the response depends on one's appraisal of the specific situation (Lazarus and Folkman, 1984). Extensive recent work has focused on how individual differences impact people's response to challenging or even stressful events.

One of the constructs used to assess these individual differences is trait emotional intelligence. This construct is defined as "perceived emotional self-efficacy" and measures people's tendency to perceive and manage their emotions (Sevdalis et al., 2007). Trait EI includes a series of emotion-related personality traits and is considered as a broad and general dimension of personality (Petrides et al., 2007). Critically, Peña-Sarrionandia et al. (2015) suggested that, compared to the study of specific regulatory strategies, trait EI is a better measure of individual differences in emotion regulation. This is a key insight for our work, since the high variability in people's responses to stress means that targeting specific regulation strategies may expose us to the risk of not capturing it. Instead, measuring trait EI we can focus on the flexibility and adaptability of people's regulation. Consistently, Peña-Sarrionandia and colleagues showed that people with high (vs. low) trait EI are more likely to downregulate intense emotions (such as fear, anger, or sadness) in stressful situations, and are more prone to perceive events as less negative. In line with this conclusion, Mikolajczak and Luminet (2008) have found that individuals with high trait EI appraise a stressful

situation as a challenge, rather than a threat. Additionally, EI has been associated to the efficient processing of positive and negative emotions (Fernández-Berrocal and Extremera, 2006). So, it is possible that individuals with high (vs low) EI have faster mood recovery after being exposed to negative or stressful events (Salovey et al., 2002). Finally, existing data report that people with high (vs. low) trait EI tend to be more effective at stress management and to have superior levels of trait happiness, trait optimism, and self-esteem (Petrides, 2009). For instance, people with high trait EI report lower levels of occupational or life stress than their low EI counterparts (Mikolajczak et al., 2006; Extremera et al., 2007). To our knowledge, the moderating effect of trait EI on the relationship between stress and prosocial behavior has seldom be tested, especially when looking at different types of stressors. There is a lack of understanding on how EI may affect prosocial behavior in terms of individuals' willingness to help and donate when experiencing stress.

The goal of the present study is to assess the relationship between different types of acute stress and willingness to help and donating behaviors also considering the role of emotional intelligence. In addition, given that data were collected during the 2020 COVID-19 pandemic, we also considered whether willingness to help and donations change as a function of the target of the donation. We assessed whether participants were more willing to give to a charity collecting funds for either COVID-19 or flu patients and their families. To achieve this goal, we designed a 4 x 2 experiment in which participants were randomly exposed to one of the four stress/control conditions (e.g., cognitive, social, emotional stress or control condition), while all were presented with the two charity scenarios.

Specifically, we aimed at answering the following research questions (RQ).

RQ1a) Does willingness to help change as a function of the type of stress experienced by participants (i.e., cognitive, emotional, and social stress vs. control)?

RQ1b) Furthermore, does willingness to help change as a function of the target of the donation (i.e., COVID-19 vs. flu)?

Given the previously reported relationship between social and cognitive stress and willingness to help (Sollberger et al., 2016; Tomova et al., 2017), it is expected a positive change in willingness to help after the exposure to those types of stress. While for the effect of emotional stress on willingness to help remains to be explored. It is hypothesized that people will be more willing to help COVID-19 (vs flu) patients considering their potential sensitivity to current pandemic related situation (Jones et al., 2020).

RQ2) Does people's trait emotional intelligence moderate their willingness to help as a function of type of stress and target of the donation?

It is hypothesized that individuals with higher (vs lower) trait EI scores will be more willing to help others when exposed to stress (Agnoli et al., 2015), and that trait EI can have a moderating role on the stress and willingness to help link. In relation to whether this moderating role changes as a function of the type of stress and target of the donation, given the lack of data, no specific hypothesis can be advanced, hence this question remains exploratory.

RQ3) Does willingness to help mediate the effect of the independent variables on the actual donation behavior displayed by participants?

This research question is consistent with existing work in the domain of charitable giving showing that people's willingness to help has an impact on their actual decision to donate (Caserotti et al., 2019). Since we expect to find that specific types of stress should have different impact on both willingness of help and donations, we should be able to find the mentioned mediation effect. Furthermore, we will also assess whether the trait EI will have a moderating role in the mediation model. As we reported above, no specific hypothesis can be advanced, and we assess the role of trait EI in an exploratory way.

7.3 Materials and methods

Participants

The sample was composed of 400 undergraduate students, 200 male participants (50 %) with a mean age of 24.2 ($SD = 4.72$). Each of four conditions comprised 100 students balanced for gender (50/50). Students of developmental psychology course, at the University of Padova, were invited to participate in the study in exchange for course credits.

Procedure

Data were collected on-line between October and December 2020. As shown in Figure 7.1, after obtaining informed consent from participants, an initial survey allowed to collect demographic information together with data on fear of COVID-19, trait emotional intelligence and empathy. Subsequently, participants were invited to take part in an online video-interview with 2 experimenters to investigate the effect of stress on willingness to help and donate. Participants filled in the initial questionnaires at the beginning of the data collection and scheduled their call in within one week after they provided the first information. We did approximately 5-7 interviews per day. The rationale for the video-call was to assure that the participants remained focused on the task and did not avoid the stress exposure. Overall, 5 experimenters were involved in the study while 2 experimenters for each interview were randomly assigned among conditions. During the interviews, participants were not requested to talk, but type or chose preferred answers. Participants were randomly assigned to one of the four conditions: three included the exposure to different types of stress (social; cognitive; emotional) while one was a no-stress control condition. Before and after the stress or control task exposure, participants were asked to self-report on their negative affect. After the stress exposure, to measure willingness to help and donation behavior, all

participants were presented with the description of a charity raising funds for a very ill COVID-19 or flu patient². Participants were later asked to self-report on their willingness to help the patient and the amount of money they were willing to donate to the organization. Subsequently, participants were exposed to a short reminder of the stressful/control task they had experienced before and were then asked to read the other patient scenario and self-report on willingness to help and donate. The scenarios were randomized within condition, so that 50% of the participants were exposed to COVID-19 case after the task and the flu case after the reminder and vice versa. Lastly, they were asked to self-report on perceived danger of COVID-19 and flu, and the probability of getting the viruses.

Figure 7.1 Graphical representation of study procedure

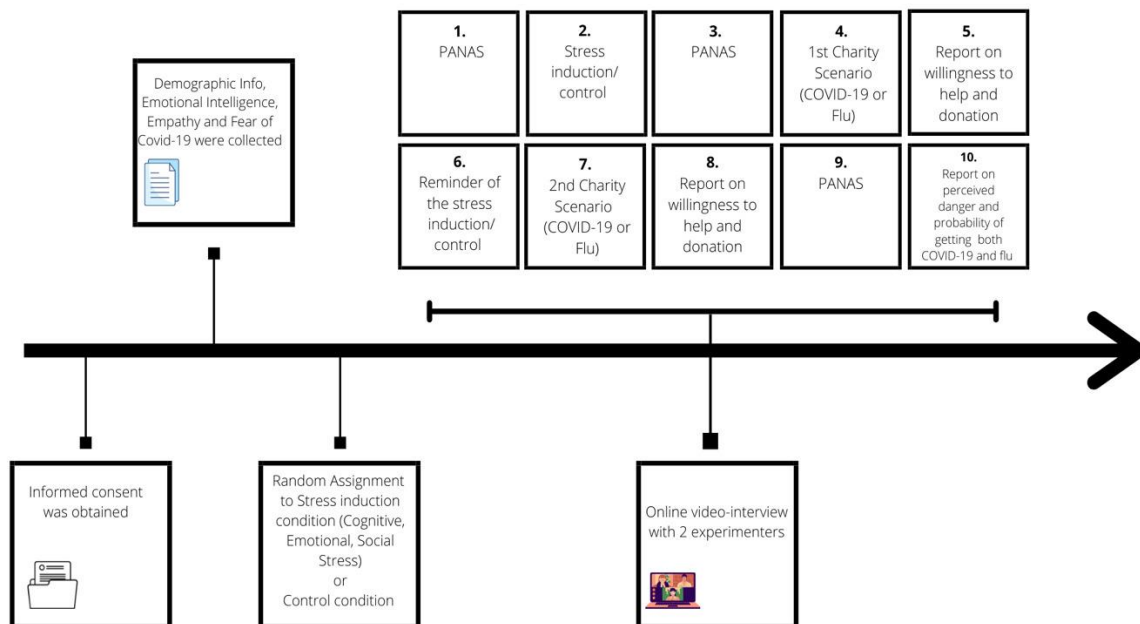


Figure 7.1 Graphical representation of study procedure. The overall data collection lasted approximately 3 months, containing 3 different sessions and the distance between one and the other session was kept similar per each participant. The first session included the study

procedure description when the informed consent was obtained as well. From 2 to 3 days later, they were sent an online questionnaire on demographic data and individual variables lasting approximately 10 minutes. One week later, after being randomly assigned to one of the conditions, participants were invited to take part in the online video-interview lasting about 15 minutes. In average 5-7 interviews have been done per day for 3 months.

Measures

Stress Induction Conditions

The Opensesame software (Mathôt et al., 2012) was used to develop online manipulations, and the duration of each condition was assured to be approximately the same (around 13 minutes).

Social stress. To induce social stress, participants were exposed to an on-line version of the Sing-a-Song Stress Test (SSST; Brouwer and Hogervorst, 2014). In the present study the SSST was administered in an internet-based version (e-SSST), but the stimuli and overall duration of the task were comparable with the original task. Participants were requested to sit comfortably and read the phrases appearing on the monitor one of which contained a task (task essence was not specified). Nine neutral phrases with the same length were selected from Italian Wikipedia (e.g. “The body of the average human adult male is about 60-63% water and the average adult female is about 52-55%”), and were presented for 8000 ms. The 10-th phrase contained the task: “Please, choose a random song and start singing in a loud voice. We are registering your performance so that our colleagues can watch and judge it later. Once you are ready, please, press the button and keep singing till the “Rec” disappears”. The recording simulation was done with the “Rec” icon being active at the right top of the screen for 3 minutes (duration was not previously specified). In the end, they got a message that the registered performance will be sent for evaluation. During the reminder,

they were asked to sing a short piece of song (“Rec” lasting for 1 minute); this second part of the task was justified by saying that we need to make sure the recording went well.

Cognitive stress. To induce cognitive stress, a mental arithmetic task was adopted, following previously used protocol (Qi et al., 2017). Six blocks (2x2x2) of addition, subtraction and multiplication expressions were presented respectively with one (e.g., $3.4 + 6.3$) and two decimal numbers (e.g., 2.06×4.72) so that each block contained 7 arithmetic expressions of the same type while the expressions containing one or two decimals presented randomly. Under time pressure, participants were asked to estimate whether the result of each calculation would be above 10 or not by pressing “z” or “m” keys. At each block, following the fixation point of 100 ms, participants were given 3000 ms to see the calculation and to provide their response. As soon as the response was submitted (or 3000 ms passed) the formula disappeared. After each block, participants got a feedback on their reaction time and accuracy, and in 80 % of cases an automatically generated negative feedback (e.g., “Oh no, you failed, you could be faster.”) appeared despite the performance. The reminder of the task was composed by only 3 blocks that followed the same design.

Emotional stress. To induce emotional stress, participants were exposed to 36 pictures³ selected from the International Affective Picture System (IAPS; Lang et al., 2008). Based on IAPS norms, all the pictures had a negative valence (2.0 or less) and with high arousal (at least 6.0) which have been reported to correspond to the ranges of pictures inducing negative stress (van Stegeren et al., 2008). Participants were asked to sit comfortably and watch the pictures, each lasting 8000 ms and following one after another. The sequence of the stimuli was the same for all participants. The reminder of the task was composed by 16 distress inducing pictures following the same procedure.

Control task. The no-stress control task was developed based on a standardized low-cognitive-demand task (Plain Vanilla; Jennings et al., 1992). Participants were asked to watch images containing grey balls of different shapes and positions at each stimulus, and to count the cases when a green rectangle appears. 36 images of 8000ms each were presented among which 9 images contained a rectangle. The reminder task consisted of 12 images with 3 rectangle cases.

Charity Scenarios

To measure willingness to help and donation behavior, all participants were presented with two scenarios describing a case of a very ill COVID-19 or flu patient for whom a charitable organization was collecting funds (see supplementary Figure 1S). Specifically, participants were instructed to read an article on a serious case of a COVID-19 or flu patient. Both the COVID-19 and flu articles had the same length (one page), and structure and the patients' pictures were balanced for participants' gender. After reading the article, they were asked to self-report on willingness to help him/her (i.e., "If you were given a chance how much would you be willing to help him/her?") on a scale from 0 (not at all) to 6 (very much) (adapted from CLS, Sprecher and Fehr, 2005). Lastly, participants were asked whether they were willing to donate to the charitable organization in support of the COVID-19 and flu patients and if yes how much they were willing to donate on a scale ranging from 0 to 10 euros (e.g., "Imagine having 10 euros in your wallet, would you like to donate money for this patient? If yes, how much would you donate (0-10)?").

Trait Emotional Intelligence

The TEIQue-SF (Petrides, 2009) is a 30-item self-report scale that measures trait EI using a 7-point scale ranging from 1 (completely disagree) to 7 (completely agree). Items ask

participants about their tendency to perceive, regulate, and express their emotions (e.g., “I usually find it difficult to regulate my emotions; I often pause and think about my feelings”). The internal reliability of the scale was high in this study (Cronbach’s $\alpha = .86$).

Control Variables

Changes in negative affect. To assess the changes in negative affect before and after the stress induction procedure the Negative affect subscale of the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) was used. Specifically, we asked participants to indicate the extent to which they feel in a specific way at that moment from 0 (not at all) to 4 (extremely). The list of all the negative affective states is presented in Table 1S (supplementary materials). The scale showed a high internal reliability in this study (Cronbach’s $\alpha = .90$). For the analysis, we have computed the delta PANAS which is the difference between the PANAS 2 (after stress) and the PANAS 1 (before stress). It is worth noting that, having a self-report measure of how participants perceive their affective response after being exposed to different stressors might offer important information on the conscious subjective component of the specific response activated after each type of stressor.

Fear related to COVID-19. The fear of COVID-19 scale (Ahorsu et al., 2020; Soraci et al., 2020) was used to measure participants’ fear of the virus. It is a 7-item self-report scale asking the participants to report on the extent to which they agree or disagree with the presented statements using a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree) (e.g., “I am afraid of losing my life because of Corona”). The scale’s internal reliability was high in this study (Cronbach’s $\alpha = .87$).

Empathy. Toronto Empathy Questionnaire (TEQ; Spreng et al., 2009) is a 16-item scale that was used to measure empathy. The internal reliability of the TEQ was high in this study (Cronbach's $\alpha = .83$).

7.4 Results

Preliminary Analyses

Descriptive statistics are presented in Table 7.1 (Supplementary Table 2 shows group comparisons).

Table 7.1 Descriptive statistics of main study variables

		Stress Type Condition			
		Control	Cognitive	Emotional	Social
		M(<i>SD</i>)	M(<i>SD</i>)	M(<i>SD</i>)	M(<i>SD</i>)
	Scenario				
	Covid-19	3.48(1.49)	3.60(1.60)	3.71(1.38)	3.91(1.67)
Help	Flu	3.30(1.42) ^a	3.16(1.61) ^b	3.54(1.34)	3.73(1.55) ^{a,b}
	Covid-19 & Flu	3.39(1.45) ^c	3.38(1.62) ^d	3.63(1.36)	3.82(1.61) ^{c,d}
Donation	Covid-19	7.55(3.23)	7.09(3.13) ^e	8.12(2.76) ^e	7.58(3.26)
	Flu	7.36(3.25)	6.63(3.33) ^f	7.70(2.87) ^f	7.26(3.18)
	Covid-19 & Flu	7.46(3.23)	6.86(3.23) ^g	7.91(2.82) ^g	7.42(3.22)
	Delta PANAS	-3.64(5.63)	2.13(6.01)	9.12(9.19)	3.63(7.65)
	Trait EI	4.92(.84)	5.02(.65)	5.02(.70)	5.00(.65)

Empathy	65.00(7.22)	62.02(15.38)	64.00(9.54)	62.06(13.17)
Fear of Covid-19	25.64(9.88)	24.82(8.80)	25.40(8.58)	25.74(8.31)

Note: letters indicate group comparisons

^a $t = -2.001, p = .046$; ^b $t = -2.53, p = .012$; ^c $t = -2.11, p = .035$; ^d $t = -2.04, p = .042$; ^e $t = 2.41, p = .016$; ^f $t = 2.37, p = .018$; ^g $t = 2.45, p = .014$

Results of the correlations between main variables (Table 7.2) showed that willingness to help both COVID-19 and flu patients were correlated with each other and with donation behavior (both COVID-19 and flu), emotional intelligence, empathy, fear of COVID-19, age, and gender. Donation behaviors for both illnesses were correlated with each other, and with gender, while donating for COVID-19 patients was also correlated with empathy and fear of COVID-19. There was a correlation between emotional intelligence and affective state, empathy, and fear of COVID-19. And empathy was correlated with fear of COVID-19. Finally, there was a correlation between gender and almost all the variables (except the affective state); and between the age and fear of COVID-19.

Table 7.2 Correlation matrix between main variables

	1	2	3	4	5	6	7	8
1. Help Covid-19								
2. Help Flu	.72***							
3. Donation Covid-19	.44***	.38***						
4. Donation Flu	.36***	.43***	.89***					
5. Delta PANAS	.04	.00	.01	.01				
6. Trait EI	.11*	.12*	.01	.03	.14**			
7. Empathy	.23***	.17***	.12*	.10	.10	.13*		
8. Fear of Covid-19	.24***	.17***	.10*	.08	-.05	-.15**	.13**	

9. Age	-.15**	-.11*	-.01	.00	-.01	.01	-.04	-.15**
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Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$.

Affective state. To assess whether the stress induction had an effect on participants' affective states, we computed a delta PANAS, that is the difference between the PANAS score immediately after the stress induction and at baseline, in this way we were able to obtain an index for the change in the negative affect. Then, a multilevel linear regression was performed with type of stress (control, cognitive stress, emotional stress and social stress) and time (baseline and after the stressor) controlling for gender. Specifically, there were significant difference between the control condition and each other type of stress across time: respectively, $B = 1.32$, $SE = 0.57$, $t = 2.32$, $p = 0.02$ for the cognitive stress, $B = 3.94$, $SE = 0.58$, $t = 6.83$, $p < 0.001$ for the emotional stress, and $B = 1.11$, $SE = 0.57$, $t = 1.94$, $p = 0.05$ for the social stress. A slope analysis showed that while in the control condition there was a significant decrease in stress over time (mean at baseline = 11.63, SD = 11.65 vs. mean at t2 = 7.99, SD = 7.90; $t = -2.71$, $p < 0.001$), a significant increase emerged after the emotional stress inductions (mean at baseline = 8.65, SD = 8.35 vs. mean at t2 = 17.77, SD = 11.19; $t = 6.89$, $p < 0.001$). No significant effect on the PANAS was found after the cognitive stress induction (mean at baseline = 11.01, SD = 10.81 vs. mean at t2 = 13.13, SD = 10.10; $t = 0.56$, $p = 0.57$) and after the social stress induction (mean at baseline = 10.32, SD = 8.46 vs. mean at t2 = 13.95, SD = 8.27; $t = 0.04$, $p = 0.97$). Hence, the change in negative affect, was included as a covariate in the following analyses. Given the important changes in the overall negative affect score, in Supplementary Table 1 we report also the changes in the single affective states composing the total score. As reported in the table, participants reported to experience high levels of "Alert", "Ashamed" and "Nervous" states when exposed to the social stress condition (M= 0.99, SD= 1.36; M= 2.19, SD= 1.37; M= 0.68, SD= 1.32,

respectively); while “Embarrassed” state was high in the cognitive stress condition ($M= 0.93$, $SD= 1.18$); and “Afraid”, “Miserable”, “Disgusted”, “Sad” and “Shocked” were reported as high in the emotional stress condition ($M= 0.63$, $SD= 1.13$; $M= 0.86$, $SD= 1.19$; $M= 2.09$, $SD= 1.35$; $M= 1.22$, $SD= 1.29$; $M= 1.55$, $SD= 1.36$, respectively).

Main Results

Stress and Willingness to Help. To assess if willingness to help changed as a function of the type of stress experienced by participants (i.e., cognitive, emotional and social stress vs. control) and in response to the target of the donation (i.e., COVID-19 vs. flu) we run a multilevel linear regression model with willingness to help as the dependent variable and type of stress and target of the donation as factors as well as a second model in which we included the interaction between type of stress and target of donation. In addition, in both models, we included as covariates: empathy, fear of COVID-19, gender and change in negative affect. A model comparison showed that the addition of the interaction did not improve the fit to the data ($X^2 = 3.54$, $p = 0.32$). As a result, here we discuss only the model with the main effects of type of stress and target of the donation (Table 7.3). We found a significant effect of target of the donation ($B = -0.26$, $SE = 0.06$, $t = -4.48$, $p < 0.001$), indicating that participants were more willing to help when the target was suffering from COVID-19 rather than flu.

Furthermore, for the type of stress a significant difference emerged for the comparison between control condition and social stress ($B = 0.53$, $SE = 0.20$, $t = 2.61$, $p = 0.01$), indicating that participants were more willing to help when experiencing social stress. The differences between the control condition and the other two stress conditions were not significant ($ps = 0.09$ or higher, see also Table 7.1 for mean and group comparisons). Given the social stress condition was the only one different from the control, we decided to run a

second analysis to assess whether any difference emerged among the three types of stress manipulations. Once we changed the reference level to the social stress condition, the results showed that it was different from the control ($B = -0.53$, $SE = 0.20$, $t = -2.61$, $p = 0.01$) and the cognitive stress conditions ($B = -0.43$, $SE = 0.19$, $t = -2.26$, $p = 0.02$), whereas the difference with the emotional stress condition was not significant ($B = -0.14$, $SE = 0.20$, $t = -0.71$, $p = 0.48$).

Finally, there was a significant positive effect on willingness to help for both empathy and fear of COVID-19, while females were more willing to help than males. In addition, the theoretical relevance of the covariates was also statistically supported as the model was stronger when the covariates were included ($R^2 = .12$) compared to when they were not ($R^2 = .02$). However, the same difference among stress manipulation on the willingness to help remained significant also when covariates were removed from the model.

Table 7.3 Multilevel linear regression model with willingness to help as the dependent variable, type of stress and target of the donation as factors

	<i>B(SE)</i>	<i>df</i>	<i>t</i>	<i>p</i>
(Intercept)	2.54(.50)	402.84	5.13	.000
Condition:				
Cognitive	.11(.20)	378.24	.55	.581
Emotional	.39(.23)	378.12	1.71	.088
Social	.53(.20)	378.18	2.61	.009
Charity Scenarios	.26(.06)	376.72	-4.48	.000
(flu = 0; Covid-19 = 1)				
Delta PANAS	-.01(.01)	389.18	-.99	.323

Gender	-.00(.00)	378.12	-3.93	.000
Empathy	.02(.01)	378.46	2.69	.007
Fear of Covid-19	.02(.01)	377.87	2.05	.041

Moderating Role of Emotional Intelligence. To assess the moderating role of peoples' trait emotional intelligence we performed a multilevel linear regression model with willingness to help as the dependent variable, type of stress and target of the donation as well as the interaction between type of stress and trait EI. In addition, we included as covariates empathy, fear of COVID-19, gender and PANAS (Table 7.4). Results revealed a significant interaction between the trait EI and the contrast comparing the control condition with the social stress induction. The two contrasts including the cognitive stress induction and the emotional stress induction were not significant. All covariates that were significant in the previous analysis remained significant. A slope analysis showed that the effect of trait EI was only significant in the social stress induction condition ($t = 2.52, p = .001$) but not in all other conditions ($ts = 1.50$ or lower, $ps = 0.14$ or higher). See also Figure 7.2.

Table 7.4 Multilevel linear regression model with willingness to help as the dependent variable, type of stress and target of the donation as well as the interaction between type of stress and trait EI

	<i>B(SE)</i>	<i>df</i>	<i>t</i>	<i>p</i>
(Intercept)	2.89(.95)	377.07	3.04	.002
Condition:				
Control vs. Cognitive	-1.79(1.32)	367.63	-1.36	.174

Control vs. Emotional	-1.07(1.31)	367.34	-.82	.411
Control vs. Social	-2.41(1.33)	367.38	-1.81	.07
Trait EI	-.07(.17)	369.96	-.43	.667
Charity Scenarios (Covid-19, flu)	-.26(.06)	375.82	-4.47	.000
Fear of Covid-19	.02(.01)	366.00	2.29	.022
Gender	-.01(.00)	366.26	-3.67	.000
Empathy	.02(.01)	366.33	2.44	.015
Delta PANAS	-.01(.01)	367.91	-1.16	.245
Condition Control vs. Cognitive x Trait EI	.38(.26)	367.72	1.46	.144
Condition Control vs. Emotional x Trait EI	.30(.26)	367.64	1.15	.250
Condition Control vs. Social x Trait EI	.59(.27)	367.51	2.24	.025

Note: Baseline category for Condition was Control Condition

Figure 7.2

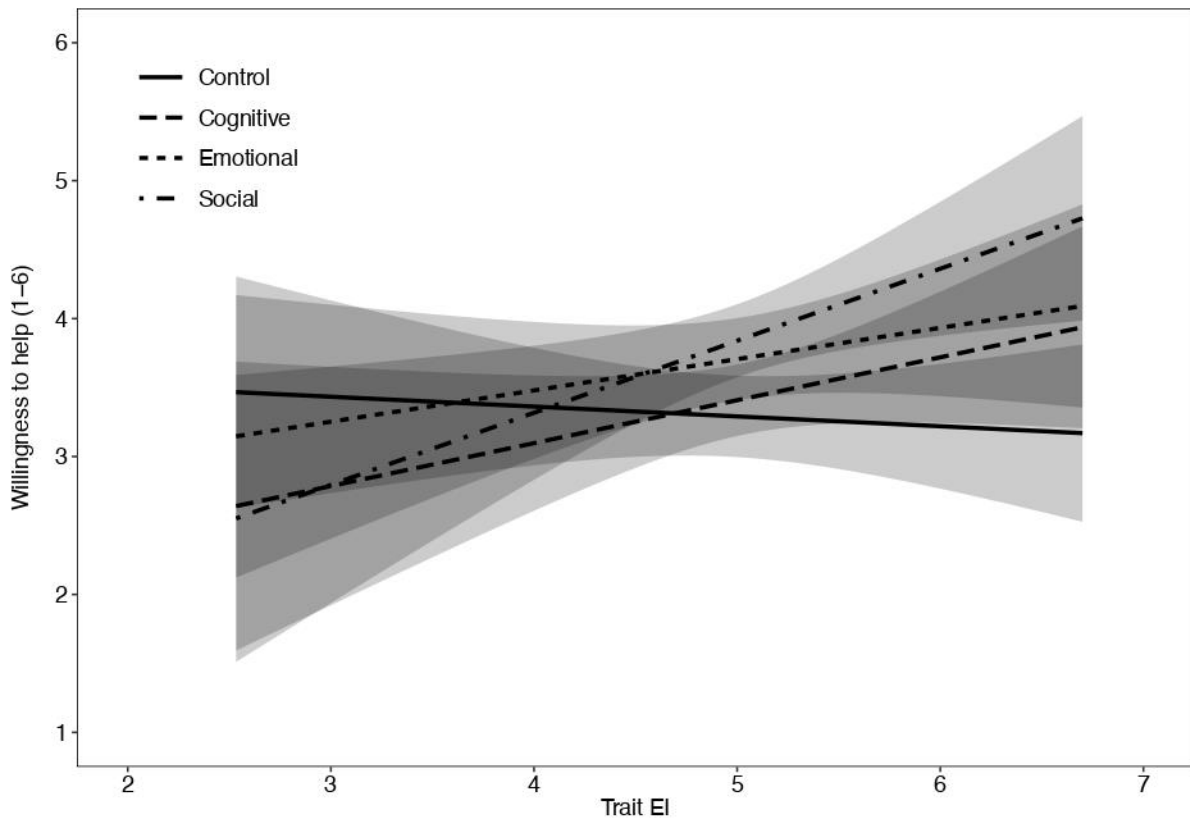


Figure 7.2 Simple slope of trait emotional intelligence predicting willingness to help for control, cognitive, emotional, and social conditions. The x-axis represents the score of trait EI, and the y-axis represents the degree of willingness to help. Conditions are represented by the types of lines.

Donation behavior. We then assessed participants' donation decisions by way of a multilevel linear regression model with type of stress, target of the donation, trait EI, willingness to help, and the interaction between condition and trait EI as predictors. In addition, we included in the model the same covariates as in previous analyses. Results showed a significant effect of willingness to help ($B = .93$, $SE = .07$, $t = 12.90$, $p < .001$). All other effects were not significant ($ps = .07$ or higher).

Mediation analysis. Lastly, we assessed whether willingness to help mediated the effect of the independent variables on the actual donation behavior displayed by participants. The tested model is presented in Figure 7.3. As it can be seen it included the main effects of

condition (control vs. social stress induction) and trait EI as well as their interaction as predictors of both willingness to help (mediator) and donation behavior (dependent variable). We also included the same covariates as in previous analyses. Although neither the condition nor the interaction had a direct effect on donation behavior (respectively, $B = 0.98$, $SE = 0.69$, $t = 1.43$, $p = 0.16$ for condition and $B = -0.21$, $SE = 0.14$, $t = -1.54$, $p = 0.12$ for the interaction, see also Table 7.1 for mean and group comparisons), there was a significant indirect effect of willingness to help ($B = 0.50$, $SE = 0.19$, $t = 2.60$, $p = 0.009$). In other words, in the social stress condition compared to the control, emerged an effect of trait EI whereby an increasing score on this dimension led to an increase in willingness to help and, as a result, to higher donations.

Figure 7.3

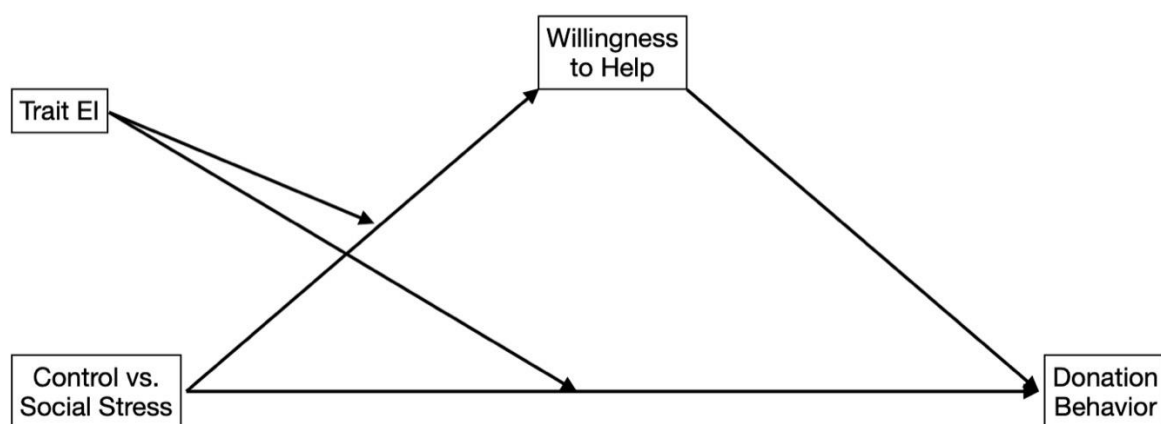


Figure 7.3 Path of the mediation analysis. The model tests whether willingness to help mediates the effect of the independent variables on donation behavior.

7.5 Discussion

This is the first study comparing the effects of social, cognitive, and emotional stressors on willingness to help and donation behavior. The aim of this study was to investigate how acute

stress affects individual's willingness to help and donation behavior when considering the potential moderating role of emotional intelligence. Given the current situation related to the COVID-19 pandemic, we assessed how willingness to help changes as a function of donation target, that is COVID-19 or flu patient.

The results are consistent with previously reported data on the negative impact of social, cognitive, and emotional stressors on people's affective state (Qi et al., 2017; van Stegeren et al., 2008). Namely, when comparing with the control condition, all three stressors were associated with a change in negative affective state.

One of the key findings of our study is related to the comparison of the effects that different types of stress have on willingness to help. We found that participants were more willing to help after being exposed to social stress compared with the control condition. The change in negative affect participants reported in the social condition was intermediate compared to the emotional (highest) and cognitive (lowest) conditions. Based on the impact that each type of stress had on the participants, a plausible explanation of the effect of stress on willingness to help is that people are more likely to act when experiencing medium negative affect. That is, when exposed to social stress, participants were more willing to help than when exposed to the control condition. At a broader conceptual level, this data may be explained by the tend-and-befriend hypothesis proposed by Taylor et al. (2000), which assumes that at situations of stress an adaptive way to respond to stress may be the tendency to help others with the potential to have collaborative relations at future challenging conditions. While when participants were exposed to high distressing emotional images or the low distressing cognitive task no difference from the control condition was found. These findings are in line with Decety's empathy model (Decety and Lamm, 2006) stating that other-oriented feelings and prosocial behaviors may not occur under high levels of personal distress, since it can challenge resources and activate an adaptive stress response. It is possible that for the

participants who had an increased stress level after watching emotionally negative pictures, helping others would have been too demanding as they had to use their resources to manage their own reactions. Even from an evolutionary point of view, focusing on self needs at times of highly stressful situation may potentially increase one's chances to survive. It should, however, be noted that when comparing willingness to help in the social stress condition to the other two stress conditions (i.e., emotional, and cognitive stress), no significant difference was found in participants' willingness to help after a social and an emotional stressor. Yet, participants were more willing to help after the social stressor compared with the cognitive one. Not different effects of social and emotional stressors on willingness to help can be explained by the fact that specific elements of stress manipulations in both cases could somewhat promote prosociality, unlike at cognitive stress condition. Namely, participants knew their song would be watched and they might think their behavior would be evaluated as well, so perhaps they tried to perform "well" by their willingness to help. In the same way, stress inducing images could potentially promote helping behavior through visual cues, such as an image of a person in negative mood or in danger who might need support.

In contrast to highly stressful emotional condition, the cognitive stressor was associated with stress level not too different from those of the control condition and, thus, it did not affect participants' willingness to help. Hence, when thinking about the relationship between stress and willingness to help we might refer to a non-linear, inverted U-shaped function as proposed by Wolf et al. (2015). That is, possibly, under low and high levels of stress individuals may be less willing to help others in need, while a medium level of stress can be associated with seeking and providing support and may lead individuals to orient toward others. Yet, previous studies linking social stress and willingness to help or more in general prosocial behavior have found that social stress exposure increased participants' trust,

trustworthiness and sharing behavior in social interaction (Von Dawans et al, 2012); as well as altruistic responses (Buchanan and Preston, 2014).

Additionally, the affective response to each stressor could have influenced the prosocial behavior as well. As such, an alternative possible explanation of why participants in the social stress condition were more willing to help could be that the affective states like alert, ashamed, and nervous that were experienced high in the social stress condition, may have potentially led to pro-social actions (compared to afraid, miserable, disgusted, sad, and shocked states that were high in emotional stress condition). More specifically, the effect of social stress induction on prosocial behavior could be due to the negative affect experienced, for instance, the participants who felt ashamed during the manipulation might want to help others to “recover” their reputation and to give a second chance to the “evaluators” to reconsider their performance.

This first analyses also showed that the participants were more willing to help when the patient was suffering because of COVID-19 (vs flu). Even though flu when data were collected was comparable with COVID-19 in terms of prevalence and mortality rates, participants demonstrated more helping intentions for COVID-19 patients. This finding may be due to the fact, that during the pandemic people are more sensitive to this specific topic and, so, give more importance to helping for COVID-19 related reasons (Jones et al., 2020). However, it is important to point out that whereas participants were more willing to help for the COVID-19 patients, the type of stress did not interact with the patient case, thus indicating that findings were not influenced by the pandemic⁴.

The second research question aimed at exploring the possible moderating effect of trait EI on the relationship between social stress and willingness to help. Results showed that participant’s willingness to help under social stress was moderated by trait EI, namely participants’ having high (vs. low) levels of EI were more willing to help under social stress.

Since people with high trait EI are more effective at regulating their emotions, a possible explanation of this finding is that they were more able to regulate the negative affect elicited by the social stressor, thus being more willing to exert an effort to help others in need. This is in line with the notion that high trait EI scores may lead to efficient stress management and high trait happiness, trait optimism, self-esteem (Petrides, 2009).

Interestingly, this finding strengthens the hypothesis that a moderate level of distress can increase participants' willingness to help, that is better self-regulatory abilities (higher trait EI) can tune down distress and promote prosocial behaviors. It should be noted here that trait EI interacts only with social stress and not with the response elicited by the emotional stress, even though exposure to this type of stressor caused a greater negative affect compared to all the other types of stress. The rationale here might be that EI moderates the link between stress exposure and willingness to help when the response elicited by the stressor is associated with high arousal. We might expect that the social stress task, while eliciting less negative affect compared to the emotional stressor, caused greater arousal. This is supported by a wide literature using social types of stress such as the Trier social stress test (McRae et al., 2006) or the sing a song test (Brouwer and Hogervorst, 2014) to elicit a stress response and an increase in arousal (Eagle et al., 2021). This explanation however should be addressed by future studies registering the elicited response to different types of stress in particular addressing arousal, for example through registration of peripheral physiological indexes such as heart rate or skin conductance response.

Our third research question investigated whether willingness to help mediated the effect of the independent variables on the actual donation behavior displayed by participants. The mediation analysis showed that the effect of the type of stress on willingness to help led to differences in donation behavior as well. As a result, by increasing willingness to help, the social stress manipulation had the indirect effect (compared to other types of stress) of

increasing how much people were willing to donate. Furthermore, participants with greater trait EI were more willing to help and, as a result, also donated more. These results could be explained by the Theory of reasoned action (TRA; Ajzen and Fishbein, 1980) and the Theory of Planned Behavior (TPB; Ajzen, 1991): both theories assume that human behavior is affected by behavioral intention. Indeed, the intention to help, expressed by participants as willingness to help, had a direct positive effect on the actual donation behavior. A possible explanation might be that when participants felt middle levels of stress, that is in the social stress condition, acting in a prosocial fashion may reduce the stress people experienced (Buchanan and Preston, 2014; Taylor et al. 2000), whereas when stress is too high or too low participants may not be able to use giving as a regulation strategy or do not need it. Moreover, trait EI moderated the effect of social stress on willingness to help, which in turn influenced donations. Therefore, we must conclude that the indirect effect of stress on donations is not equal for all participants but depends on individual differences in emotion regulation. Indeed, on the one hand, it has been shown that there is ample variability in how specific individuals deal with stress and, on the other hand, previous work on trait EI has found it to be a good proxy of the use of more adaptive regulation strategies. As we stated in the introduction, our analysis of the role of trait EI was explorative and, as such, it should be further investigated in the future.

The present study has several limitations. Specifically, we believe that it would have been very interesting to assess the physiological correlates of stress response. We were not able to collect this data due to the pandemic, but this work would benefit from a replication study comparing the peripheral physiological responses to different types of stress and studying how it might be linked to willingness to help and donating behaviors. Moreover, the potential confounds related to the different effects of all three manipulations on prosocial behavior need to be considered. As mentioned above, the reason why participants decided to help

could partly be the specific affect induced by the stressor (e.g., ashamed) and/or their belief that the experimenters may continue to evaluate their “helping performance” after singing at social stress condition. Similarly, the pictures that they were exposed to during the emotional stress condition could potentially contain visual cues (e.g., images of someone in need/danger) promoting helping behaviors. It should also be noted that the different stress manipulation tasks required acts of different nature (e.g., signing, doing arithmetic tasks, or watching images) which might somehow influence the elicited response. However, when comparing different sources of stress, it is very difficult to have the same actions involved. Once more the inclusion of physiological indexes might help to better control this issue (e.g., checking for the effect of movement, degree of sympathetic response). Overall, further investigations are needed to address all these critical aspects. Finally, the data collection was conducted online, and together with its benefits (e.g., faster communication, less financial resources) the online data collection may potentially be a source of several issues. One of the limitations of online experiments is that the experimental conditions cannot be identical for each participant, and some external factors may be uncontrollable. We made a great effort to reduce this variability to the minimum, for instance asking participants to sit alone in a quiet room, yet we may expect the stress manipulations to work better in experimental rooms specifically designed for the task rather than within home environments (it should be noted that very recent and preliminary data have shown the efficacy of on-line stress exposure in terms of emotional response (Eagle et al., 2021)).

Despite the limitations, this study significantly contributes to both the literature on stress and that on willingness to help. Here we emphasize the importance of studying how specific types of stress, which potentially can be experienced at different levels, may be associated with people’s willingness to help, and donating behaviors. Findings reveal that after being exposed to social stress, which causes an intermediate (i.e., not too high, or too low) negative

emotional response, people are prone to act pro-socially and help others particularly when they have high trait EI. Overall, from the present study, we can expect people to engage more in giving behaviors when they are experiencing an average degree of negative affectivity in response to a social stress compared to when they are too negatively affected by an emotional stress or even compared to when in an emotionally neutral state as when in the cognitive stress and control conditions. Moreover, after experiencing social stress the fact of being good emotion regulators promotes even more helping behaviors. In other words, it would make sense to expect greater donations, for example to charities, when people are either experiencing some distress but not too much or when they are very good at regulating their distress. At the same time, when individuals are in an extremely negative affective state due to emotional distress, they are much less willing to donate. This data should give a heads up to organizations relying on charity donations in times when the population is experiencing major distress, just like is happening now during the worldwide COVID-19 pandemic.

In a time when people of all socio-economic backgrounds struggle due to either emotional distress due to COVID-19 and restrictive measures, cognitive challenges related to on line working while juggling family and house chores and social stress due to lack of social contacts for long periods of time and subsequently the return to social gatherings and interactions this study gives important indication on whether giving behaviors should be expected in relation to different distressing situations. Moreover, the slow reopening after the immunization following vaccine administration and gradual return to normality might be associated to the experience of social stress. Indeed, people might be overwhelmed by going back to daily and possibly judging social interactions. This source of stress, however, especially among better self-regulators may promote willingness to help and might be a significant period to ask for donations.

CHAPTER 8

General discussion

This dissertation provides an important contribution to the current literature on the effect of stress on mental health and behavior. The focus of the 4 studies is on both negative and positive behavioral outcomes after different sources of stress (including the traumatic stress of war). An interactional psychosocial model is adopted, and the moderation role of several individual and environmental factors is considered.

Specifically, we focused on the effect of different sources of stress, in terms of type, degree, event nature and duration on health and behavior given the various aspects of stress are likely to be related to specific outcomes. Our findings suggest a complete picture of the existing effect of stress amount, intensity and types on health and behaviors moderated by individual (i.e., self-compassion, emotional intelligence) or environmental (i.e., ethnic identity and social support) characteristics. In this chapter, I will discuss the main findings obtained from the studies that we conducted by linking them to the previous literature, as well as addressing the main effects based on this dissertation objectives. I will further present several limitations that this dissertation has by suggesting possible indications for futures studies. Finally, the chapter will be concluded by the description of the main theoretical and practical implications that the results of this work may suggest.

8.1 War-stress effect on mental health

In Study 1, we studied the impact of war-related stress on war exposed civilians. Specifically, the objective of this study was to investigate how the exposure to the 2020 Nagorno-Karabakh war influenced mental health symptoms (i.e., PTSS) of Armenian civilians shortly after the event and after six months as the population adjusted to the after-war phase.

Additionally, we aimed to test whether and how individual characteristics (i.e., emotional intelligence and self-compassion) moderated the war-PTSS link at the two different post-war phases. The results showed that participants reported significantly greater PTSS shortly after the war as compared to 6 months after the war ended. We found that while lower self-compassion was related to more PTSS at the beginning (shortly after the war), lower emotional intelligence was associated with more symptoms 6 months later. These data suggest that individual characteristics such as self-compassion and emotional intelligence can have time-specific protective effect against civilians' negative health outcomes following an exposure to war. Our findings further indicate that during different post-war adjustment phases, different individual resources may promote more positive adaptation. Specifically, having more self-compassion at the initial stage of the adjustment (i.e., shortly after the war) works as a protective factor whereas having high emotional intelligence later on may foster better health consequences.

This study adds an important contribution to the research on stress effects on mental health by focusing on the outcomes of a severe source of traumatic stress like war. Moreover, the focus of this study is on a region, Armenia, that is likely to be under-studied by war research (see, Phillips and Greene, 2022). Consistent with previous works studying the war-conditioned health consequences among a variety of populations (e.g., Madoro et al., 2020; Eytan et al., 2004; Stevanović et al., 2016) our findings on less studied country like Armenia provide more comprehensive understanding on war-related negative health outcomes.

Armenia is a country that historically faced military conflicts most of the time because of territorial disagreements and sometimes due to religious-ethnic issues and, thus, people living there have a high probability to be constantly exposed to traumatic stress triggered by war-like situations. However, Armenia has not received much attention by previous research studying conflicts and wars. In fact, it is likely that the literature on armed violence covers Western countries more often than non-Western countries, such as Armenia for example, as proposed by Western bias hypothesis (Phillips and Greene, 2022). There may be different reasons for this possible bias, for instance, the feasibility of research may vary by country depending on several factors like economic resources needed to conduct a research, form of government or current political context of the country. That is, western countries, that are considered wealthy and often with democratic regime, may be more accessible for war researchers in terms of more developed research facilities and safe access to research locations. Whereas war research in non-western countries may carry some challenges for the researchers in terms of personal safety, lack of resources and restrictions (Morgenbesser and Weiss, 2018; Greitens and Truex, 2020). Even though there is a body of research on psychological outcomes of war, the general knowledge may be skewed since it is mainly based on the results published on specific regions and countries that were accessible for research. Hence, the generalization of this data may be related to several issues and applying US or European models to other countries can be problematic (Zhang, 2003; Sharman, 2018; Cheng and Brett, 2019). Thus, our research conducted on Armenian people provides important empirical insights on war-related psychological response of under-studied populations potentially enhancing the general literature on the mental health impact of the war.

In addition, this study adds initial evidence to the literature on how different individual characteristics might play different roles in influencing adaptation based on the time passed

since the event. This information is particularly relevant in world regions where conflicts last for a long period of time or occur repeatedly.

After experiencing war trauma, people go through different phases of the psychological adaptation. An initial and immediate, sometimes affective, reaction to the event gives place later on to more adjustive patterns of thinking and behavior. According to Pennebaker and Harber (1993), following the immediate, “emergency” stage when people tend to openly talk and think about the event for some weeks, they progress into an “inhibition” phase when they are apt to not talking about the war while continuing to think about the event. This phase during which they possibly carry on their ruminations in solitude and isolation ends by the eight to twelve weeks after the war exposure when they enter an adaptation phase which is approximately the same period of the first phase of our data collection. This is a critical stage of adaptation when several individual characteristics may play a protective role. For instance, right after struggling against these sufferings in isolation, being self-compassionate and thinking of war as a common trauma for everyone in the community may foster more positive adaptation and prevent psychological symptoms. While in later stages of adaptation high emotion regulation skills may be important for successful adjustment. It is important to note, that the role of individual characteristics on different phases of post-war adaptation may vary by different cultural groups.

Our findings on Armenian population showed that self-compassion and emotional intelligence are important indicators of better health outcomes after the war. We reported that self-compassion was a protective factor shortly after the war ended, whereas emotional intelligence played a significant role later on suggesting that the protective effect of these individual characteristics may have a time-specific pattern. These data can have a significant contribution in applied psychology focused on the intervention and prevention of war-conditioned psychological impairment or programs targeting the vulnerable groups. When the

war was just ended self-compassion protected a portion of Armenian civilians from developing severe health consequences. While replication studies on other countries are needed to have a more general picture of this effect, these findings suggest that interventions targeted to improve self-compassion skills may be beneficial for this population shortly after the war exposure. In fact, previous studies reported that self-compassion is a characteristic that can be modified with the targeted intervention (e.g., Beaumont et al., 2012; Neff and Germer, 2013; Kearney et al., 2013). Additionally given emotional intelligence was protective 6 months after the war, Armenians who have low level of emotional intelligence may be vulnerable for developing PTSS when some time passes after the war exposure. Thus, the prevention of the development of PTSS after the war exposure may be possible by targeting this potential vulnerable group.

8.2 The role of culture and ethnic identity on war-related outcomes

In Study 2, we studied the psychological impact of the 2020 Nagorno-Karabakh war on Armenian civilians' mental health focusing on cultural aspects. In particular, the main goal of this study was to explore the effect of war on civilians by examining the direct and interactive effect of cultural and environmental characteristics such as ethnic identity and perceived social support on post-traumatic stress symptoms following the exposure to war. The results showed that higher social support was directly related to fewer post-traumatic stress symptoms. Furthermore, we found a significant interaction between ethnic identity and social support; specifically, among individuals perceiving lower social support from friends and family those with higher ethnic identity reported more post-traumatic stress symptoms than those with lower ethnic identity. These findings suggest that social support has a protective role against stress-related negative impact after war exposures. Our data further indicate that

when perceived social support is low, Armenians with stronger ethnic identity are more vulnerable and report higher post-traumatic stress symptoms.

This study provides an important contribution to the general literature on psychological impact of severe traumatic events related to military conflicts and war focusing on ethnic and cultural aspects and shedding light to the existing inconsistencies reported by previous studies. Our findings suggest that individuals who have strong sense of belonging to their ethnic groups may potentially be at risk of developing post-traumatic stress symptoms after being exposed to the events that they may perceive as a potential hazard for their ethnic group members and a threat toward their ethnicity, like war in case of our study. Interestingly, however this is true only for individuals that are perceiving low social support from their family and friends. The impact of ethnic identity on traumatic stress outcomes has not been clearly defined by previous works with some studies reporting positive associations while others showing non-significant link between ethnic identity and post-traumatic symptomatology (e.g., Khaylis et al., 2007; Kaur and Kearney, 2013). There may be several plausible explanations for the existing inconsistency of data. It is possible that the effect of ethnic identity may be significant at the presence of other factors, like social support in case of our studies. It is worth noting that type of traumatic event that has been studied by different works varied across studies. As we discussed earlier in this work, the nature of stressful and traumatic experience may considerably differ and depending on the type of event, individuals may have different perceptions and appraisals in terms of threat toward own and group well-being as well as existing coping strategies. For instance, traumatic events like armed conflicts, wars, violence and aggression toward the race or discrimination are likely to be appraised as a threatening for own ethnic group unlike the events such as natural disasters, serious accidents, or youth maltreatment. While further data is needed to investigate how ethnic identity and social support may impact mental health after experiencing different

types of traumatic events, we showed that at war exposures having a strong sense of ethnic community with expectations to be supported by the group members, but at the same time not having enough support from others may trigger negative outcomes among Armenians. These findings can elucidate previous mixed findings in general literature on cultural aspects of psychological impact of traumatic stress.

This study revealed that stronger ethnic identity together with low perceived social support was related to greater post-traumatic symptoms among Armenian civilians. This data suggests that having supportive social community may potentially protect individuals, especially those who have strong ethnic identity, against war-related negative symptoms. Our data may have a significant contribution to the field of prevention and intervention of trauma related psychological symptoms by providing evidence-based knowledge on the identification of potential risk groups and possible factors to target during intervention. The local health care professionals in Armenia, may identify individuals with strong ethnic identity and low social support right after the war to apply timely prevention of further symptomatology development. Moreover, the intervention plan may focus on increasing social interactions and supportive social networks of individuals after the war stress. Even though further replication studies on other samples from different ethnic groups are needed to generalize these findings, our data suggest that interventions targeting social support may be beneficial for Armenians and for similar cultural groups.

8.3 Stress-related maladaptive behavior

The Study 3, focused on the link between different sources of potentially traumatic stress and their possible effect on maladaptive behavior. The objective of this study was to explore the link between stressful and traumatic life events, with different amount and duration, and maladaptive behaviors like alcohol use. Moreover, we tested how environmental variables

like social support may moderate the stress-alcohol use link in women and men. The results revealed that longer stress duration and more stressful events were associated with more regular alcohol use and greater alcohol consumption respectively. And more stress events and longer duration were each associated with higher alcohol use severity (AUDIT score). Stress duration interacted with sex and SS to predict AUDIT score: longer event duration with low social support for women or high social support for men predicted higher AUDIT score. Stress quantity also had a trending interaction with social support and sex to predict the amount of alcohol use in the same direction as with the AUDIT scores. These findings indicate that more stressful events and longer duration are associated with more regular problematic alcohol consumption. Moreover, this data suggests that there is a differential moderating effect of social support and gender, indicating that social support buffers stress-potentiated drinking in women, but promotes it in men.

These findings showed that both stress quantity (number of stressful events) and severity (event duration) were associated with high rates of alcohol use. Previous research has systematically studied how stress may be related to behaviors that are dysfunctional and not adaptive such as alcohol use and, in fact, the current literature reports a significant positive association between stress and alcohol drinking (e.g., Sillaber and Henniger, 2004; Blaine and Sinha, 2017). Stress is a multifaceted concept having several aspects in terms of amount, duration, exposure types and many other facets. When studying stress and related outcomes it is possible to obtain a comprehensive understanding of the studied effects only by viewing stress from different perspectives and targeting multiple aspects of it as we tried to implement in this dissertation. The importance of more integrative assessment of stress is raised especially when studying negative outcomes of stress like unhealthy alcohol consumption. It is well-known that stress amount or number of stressful events, as often studied by literature, is highly predictive of alcohol use severity and amount (e.g., Sinha, 2012; Blaine and Sinha,

2017). However, when focusing mainly on this aspect of stress there is a risk of not capturing the negative consequences of other aspects of stress like intensity. For example, when measuring stress people may report low amount of highly intensive stress that may potentially prompt drinking in a similar way as the high amount of stress. Thus, our findings on the effect of both stress amount and intensity may contribute to a more extensive scientific knowledge by enriching the general literature on stress effect on alcohol use.

We further reported that longer stress duration with low social support for women or high social support for men was related to higher severity of alcohol use. These findings indicate that having supportive social network may buffer stress-motivated drinking in women, however, it can prompt alcohol consumption in men at different levels of stress exposure. Sex differences in the moderating role of social support may potentially be related to the differential sources and types of social support that women and men are supposed to have (Homish and Leonard, 2008; Platt et al., 2010; Urberg et al., 2005). Our data may have a practical significance in the field of intervention and treatment of alcohol related health problems. Given women who receive support from others may be protected against stress-motivated drinking, intervention programs aimed at increasing the amount of social support among stress exposed women may be relevant for the prevention of unhealthy alcohol consumption. On the other hand, men who get social support from others during stress are prone to use more alcohol. To prevent the health risks of stress-related alcohol use among men therapeutic programs may benefit from targeting the source of social support (e.g., drinking-supportive friends) potentially improving the quality of received support. Even though more replication studies are needed on this sex-specific protective effect of social support on stress-alcohol use link our findings may contribute to the evidence-based interventions for individuals with alcohol-conditioned health problems.

8.4 Stress-related adaptive behavior

In Study 4, we investigated the impact of different types of acute laboratory micro stressors on positive and adaptive behaviors like prosocial behavior. Specifically, we aimed at exploring whether different types of stress, potentially experienced at different levels, influence peoples' prosocial behavior (willingness to help, donations) while considering moderating role of individual characteristics like emotional intelligence. The results of this study showed that when compared to a control condition, after being exposed to a social stress, that was experienced at medium level, people were more willing to help a person in need. Additionally, our results revealed that after experiencing a social stress, participants with high (vs low) trait EI were more willing to help, and, as a result, donated more. These findings suggest that moderate levels of stress are linked with increased prosocial behaviors. This data further indicates that when stress is not too threatening, high EI can regulate it and promote prosocial behaviors.

This study showed that experiencing social, moderate stress together with having high emotional intelligence maybe be related to positive behaviors like willingness to help and donations. This data adds a contribution to general knowledge and supports the notion that stress can prompt not only maladaptive behaviors, as we demonstrated in Study 3, but also adaptive, other-directed behaviors potentially important to struggle with future stressful situations as reported also by previous research (e.g., Takahashi et al., 2007; von Dawans et al., 2012; Vinkers et al., 2013). Moreover, like in Study 3, we addressed several aspects of stress in this study, such as we manipulated different types of stressors and measured the level of stress that the participants experienced highlighting the importance of a multidimensional assessment of stress responses in research. We found that only in case of social, intermediate levels of perceived stress people were willing to help others, as compared to low cognitive and high emotional stressors. This data contributes to the general stress

literature by providing a broader understanding on which types and levels of stress may be related to adaptive responses that have the potential to foster stress-related negative outcomes.

We found that after being exposed to social stress, which was related to an intermediate (i.e., not too high, or too low) negative emotional response, people tend to act pro-socially willing to help others. In addition, this was linked to an increased prevalence in donating behaviors particularly when participants had high trait EI. These findings may have importance practical implications especially for the organizations which are dealing with charity and donations by providing knowledge on potentially successful periods to expect increased charity activities and donations. Namely, regarding the type of stress, the situations of global social stress when people are forced to be isolated experiencing a lack of social interactions for a long time (for example, happened during COVID-19 pandemic) may be critical periods to ask for donations. Moreover, in relation to the level of stress it would be realistic to expect greater donations when people are experiencing medium degree of distress but not too high. In contrast, during severe types of stress or traumatic events when people experience high intensity of negative emotions and need to deal with their own challenges expecting high donations and charities might not be reasonable.

8.5 Conclusion

To conclude, the findings of this dissertation provide empirical evidence supporting the effect of different sources of stress on psychological and behavioral functioning. Specifically, we addressed the impact of war-stress on mental health considering cultural aspects, stress-conditioned maladaptive and adaptive behaviors. This data contributes to a more integrative knowledge on stress outcomes in terms of health and behavior consequences, as well as the interaction patterns of a variety of factors that act as moderators of stress-outcome

relationship. Regarding the war-stress effect on mental health, our findings support the knowledge of adverse effect of war-related stress on exposed civilians by also shedding light on the specific factors that may help individuals to struggle with post-traumatic symptomatology depending on specific time periods of post-war adjustment. This data was obtained among an under-studied population (Armenians) that has a high probably of war exposure, thus representing an important addition to a more comprehensive conflict research data which may allow the understating of war outcomes within a broader cultural context. While further replication studies are needed for the generalization of these results our findings provide important hints for timely interventions targeting self-compassion shortly after the war and emotional intelligence later to improve health outcomes of populations like Armenians following the war exposure. In relation to the role of culture and ethnic identity on war-related outcomes, our data shed light on the existing mixed findings on the link between ethnic identity and post-traumatic stress symptoms related to war exposure by showing that strong ethnic identity may be linked to negative mental health consequences among civilians exposed to war but only among individuals perceiving low social support. In addition, even though further data is needed to study how ethnic identity and social support may affect post-traumatic symptomatology of different ethnic groups after war, our findings suggest that having enough social support from the community may potentially protect individuals with strong ethnic identity against negative health consequences after war. This data may provide important hints for health care professionals aiming to prevent and reduce war-related psychological symptoms among ethnic groups like Armenians by targeting social support. With regard to stress-related maladaptive behaviors our findings support the notion that stressful and traumatic events may be related to dysfunctional patterns of behavior in terms of alcohol consumption and misuse by suggesting a more integrative view of stress assessment in this context. We found a negative effect of a less-studied aspect of stress (its severity) in

terms of alcohol use, integrating it with well-studied facets (stress amount) suggesting that several aspects of stress may lead to maladaptive coping after stress exposure. Even though further data is needed, our findings on the moderating effect of social support may provide important insights to reduce the stress-motivated alcohol drinking. Finally, with respect to stress-related adaptive behaviors our findings confirm the positive association between stress and prosocial behaviors like willingness to help and donations by providing a better understanding on the effect of different types and degrees of stress in this regard. Following the manipulation of different types of stress that participants experienced at different degrees, our data indicates that only medium level of stress may lead to other-directed behaviors, ones again contributing to a more extensive picture of stress effect on behavior through the consideration of stress as a multidimensional concept. When stress does not represent a threat for the self, rather it is related to medium level of negative affect, people who have efficient emotional intelligence skills are willing to help others potentially creating collaborative connections for future stressful situations.

Overall, the findings of the studies presented may be linked and provide important insights for future directions. For instance, we reported that emotional intelligence is likely to play a significant role in response to stress promoting not only resilience but also prosocial behaviors. Interestingly, however, the effect of this individual characteristic is more pronounced when the level of stress is moderate or low, and not severe. For example, EI played a role as a protective factor after the war in Armenia when time had gone by, and the level of perceived stress was probably lower compared with right after the ending of the conflict. Similarly, prosocial behaviors increased in response to a laboratory induced source of moderate stress in individuals with higher EI. Further studies should investigate the role of EI in response to different events and different levels of perceived stress. On the other hand, there were some dissimilarities in our findings that may be interesting to further explore by

future research. It seems like stress that is experienced at high intensities may trigger maladaptive behaviors, however it may not motivate adaptive behaviors. That is, participants who were exposed to highly intense stressors (stressors having long duration) were involved in maladaptive behaviors, namely they reported increased alcohol use. But we have also seen that when stress is experienced at high intensity (like emotional stress that we manipulated online) people do not tend to have adaptive and prosocial behaviors, like donations for the ones in need. It would be interesting to better study the effect of intense stress on different patterns of maladaptive and adaptive behaviors by future studies.

Our findings may open new avenues for several novel aspects of stress, mental health and behavior that may be interesting to study in the future. For example, investigating donations and prosocial behaviors also in the context of war or to explore the effect of cumulative acute mild distress (as the one we manipulated online) on mental health. With this regard, even if not included in this dissertation, we have conducted a qualitative study (120 interviews) in Armenia after the Nagorno-Karabakh war exploring whether compassionate acts are possible after the war as well, and whether they could have a protective effect on war-related mental health symptoms while also considering the possible moderating role of emotional intelligence.

8.6 Limitations and future directions

The studies presented in this dissertation bring several important contributions to the existing literature, however, there are several limitations that need to be acknowledged and possibly addressed by future research. In this section, I will discuss the main limitations trying to provide some hints for future directions.

First, all studies presented in this work were conducted based on cross-sectional design. This design allows a fast implementation of research (especially following research-relevant

events like war) and make it possible to analyse multiple variables providing pathways for additional hypothesis and assumptions. However, cross-sectional designs do not allow to make inferences about the causality and long-term effects of observed associations. Future studies may design longitudinal investigations to address the long-term effects of stress on health and behavior and the role of moderators over time.

Second, our studies would benefit from the inclusion of physiological correlates of stress response. While we were not able to assess physiological measures of stress for different reasons (including the restrictions related to COVID-19 pandemic) further replication data that focuses on the peripheral physiological responses of stress can strengthen our findings on stress related outcomes in terms of health and behavior.

Third, some of the measures used in our studies require further exploration, improvement, and validation since they may be a subject to certain biases and confounds. Namely, we used self-report measures to assess the variables of interest and even though they are widely used scales the results might be biased by social desirability; possible over-reliance on memory; or participants' lack of insights on their own feelings or behaviors. Future studies are recommended to use wider range of measures assessing these variables and possibly integrating self-report data with the physiological ones. Additionally, even though we followed previously proposed translation and cultural adaptation guidelines to translate the measures assessing war-related symptomatology, there was a lack of validated questionnaires on traumatic symptoms assessment for the Armenian population. Future studies may address this issue by validating mental health screening tools for Armenians.

Forth, most of the data was collected online, and while it can have some benefits (e.g., faster communication, less financial resources) the online data collection may also be related to several issues. Firstly, the access to online surveys may be limited to a specific portion of people having certain age; easy access to internet and gadgets; or specific socioeconomic

status. Furthermore, even though we carefully considered health risks when developing a protocol for studies in Armenia, web-based assessment of mental health symptoms among sensitive population like war-exposed civilians may be related to several issues (stigma, confusion, over-identification with the problem etc.). Finally, manipulating stress in online experimental settings might be related to several environmental biases. Even though there is data reporting the efficacy of online stress exposure experiments (Eagle et al., 2021) future studies are encouraged to carefully address the aforementioned issues when conducting online data collections.

Fifth, gender differences were directly assessed only in stress and alcohol use study. While in other studies we included sex as a covariate in regression analysis, the sample size did not allow us to directly compare sexes given the number of other variables we examined.

Moreover, the main objectives of these studies did not include the assessment of gender differences rather we aimed exploring the associations between stress, outcome, and several other moderators. However, one may also expect gender differences in terms of stress response and related outcomes, therefore, this would be an important aspect to address.

Sixth, the participants of the studies that we conducted were recruited through convenience sampling approach. This approach has several advantages such as simple, efficient and affordable implementation and it can allow the inclusion of high number of participants, yet, it has some limits that need to be considered. That is, convenience sampling approach does not allow to have a sample fully representative of the population being studied, thus, limiting the possibility of generalization. Therefore, future studies are recommended to address this limit by possibly choosing the sample through random selection.

8.7 Implications for theory and practice

Despite the limitations discussed, this work contributes to the current stress literature and provides novel insights on how different aspects of stress may be related to mental health and behavior by considering both individual and environmental factors and their role in the stress-outcome link. Several theoretical and practical implications can be drawn from our findings that will be presented in this section.

From a theoretical perspective our studies enhance the existing literature on stress and outcomes in several ways. First, it strengthens and expands the socio-ecological model (Bronfenbrenner, 1979; Bronfenbrenner, 1986) of stress that we adapted for this dissertation, by revealing new insights on the association patterns of individual and environmental factors involved in the stress and outcome relationship. Namely, for the first time, our findings showed that protective effect of individual characteristics like self-compassion and emotional intelligence on war-mental health link may have time-specific manner; as well as the protective role of emotional intelligence on the link between acute mild stress and prosocial behavior may be present only at specific levels of stress (i.e., moderate). We also suggested that the role of environmental factors like social support on stress-alcohol use link may or may not be protective potentially depending on its source. These insights may represent important hints and suggestions for further studies when designing new projects on the field. Second, this dissertation enriches stress research by highlighting the importance of thinking of stress as a complex and multifaceted concept having multiple aspects that differently affect stress response and outcomes. Our findings emphasize that different types, amount, and intensity of stress may have varying effect on health and positive or negative behaviors. Thus, this work may open new avenues for future research and theories which may benefit from integrating the effect of multiple aspects of stress to obtain a more holistic picture of its outcomes.

Third, our work sheds light on populations that are less studied by stress and war research. We added to the general stress literature several important findings on Armenian population, that is considered as under-studied given its potential relevance for war research. Our findings on the psychological impact of war on Armenian civilians, together with the effect patterns of protective factors may open new perspective for future research assumptions and hypothesis on similar populations and can serve as a significant background for developing new research designs and protocols in this area.

From an applied perspective, this dissertation suggests several implications. First, our findings may have important clinical applications on the field of improvement of stress-related negative health consequences at different sources of stress exposures. That is, to prevent war trauma-conditioned severe mental health symptoms right after the exposure, interventions programs may be designed to improve exposed individuals' self-kindness, acceptance of own sufferings and mindfulness or tolerance toward own negative emotions. For instance, group trainings may be particularly efficient and can help the participants have a sense of "common humanity" and that their adverse experience is universal. Similarly, therapeutic trainings targeted on the improvement of emotional self-efficacy and emotional regulation may be useful some time after war exposure. Additionally, in an attempt to prevent stress related negative behaviors like alcohol misuse, interventions may be focused on increasing social support in women. For instance, trainings aiming to enhance social interaction skills and to increase the involvement in social communities may be beneficial and may protect against stress-motivated drinking. On the other hand, our findings may help identifying vulnerable groups like, men with high social support, that may risk having negative outcomes after stress by trying to prevent it (e.g., by improving the quality of received support).

Second, our studies and the methods we used may be applied by future research for planning and implementation of study projects. Namely, for online experiments, we developed and adapted several stress manipulation paradigms, some of which was designed for online use for the first time (e.g., Sing-a-Song Stress Test), by making all the implementation details publicly available. Thus, future studies may use the paradigms that we adapted and showed it to be successful for stress manipulation in online settings. Overall, the novel aspects of the methodology that we used are carefully described for each study (for instance, the calculation of the stress event duration variable that was not covered by previous research) making it possible for future directions to potentially benefit from our approaches.

Third, our findings may have implications for the NGOs as well as other foundations given that our findings on stress and donations may offer important information on how to rise charity donations or voluntary activities. Our data may help identifying successful periods for asking donations and voluntary works (e.g., common situation related to social stress, like in case of COVID-19), and situations or time periods that may not be favorable in terms of high charity donations (i.e., highly stressful, and threatening events).

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Supplementary material

Table 1S

Table 1S. Descriptive statistics of changes of all negative affect states. Scores were computed as the difference between what participants have reported after each type of the four sources of stress and what had been reported before the stressor took place.

	Cognitive Stress		Emotional Stress		Social Stress		Control	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Afraid	-0.26	1.02	0.63	1.13	0.31	1.42	-0.43	0.74
Upset	0.45	1.13	0.47	1.20	0.99	1.36	-0.25	0.81
Miserable	0.40	0.81	0.86	1.19	0.10	1.22	-0.22	0.73
Depressed	-0.02	0.58	0.21	0.86	0.23	0.62	-0.20	0.68
Disgusted	0.07	0.57	2.09	1.35	1.17	0.78	-0.06	0.46
Embarrassed	0.93	1.18	-0.48	1.07	2.19	1.37	-0.08	0.97
Furious	0.02	0.81	0.60	1.24	0.09	0.86	-0.07	0.49
Guilty	0.09	0.79	0.22	0.77	-0.10	0.55	-0.20	0.69
Unhappy	-0.06	0.74	0.74	1.13	-0.33	0.83	-0.26	0.70
Anxious	0.55	1.23	0.11	1.07	0.68	1.32	-0.21	1.03
Scared	-.32	0.71	0.33	1.02	-0.21	0.93	-0.33	0.72
Sad	-0.13	1.05	1.22	1.29	-0.55	1.10	-0.39	0.90
Alone	-0.17	0.62	0.00	0.79	-0.34	0.99	-0.21	0.52
Terrified	0.07	0.67	0.58	1.06	0.32	1.08	-0.33	0.72
Shocked	0.48	1.20	1.55	1.36	0.62	1.35	-0.39	0.83

Table 2S

Table 2S. Group comparisons of main variables.

	Cognitive		Control		Emotional		Social		<i>t</i>
	<i>N</i>	<i>M(SD)</i>	<i>N</i>	<i>M(SD)</i>	<i>N</i>	<i>M(SD)</i>	<i>N</i>	<i>M(SD)</i>	
Changes in negative affect.	101	2.13(6.03)	95	-3.64(5.65)	91	9.12(9.22)	96	3.62(7.67)	a: <i>t</i> = -6.91, <i>p</i> < .001 b: <i>t</i> = -11.44, <i>p</i> < .001 c: <i>t</i> = -7.45, <i>p</i> < .001 d: <i>t</i> = -6.28, <i>p</i> < .001 e: <i>t</i> = -1.53, <i>p</i> = .13 f: <i>t</i> = -4.44, <i>p</i> < .001
Trait Emotional Intelligence	100	5.02(0.65)	94	4.92(0.84)	90	5.02(0.70)	96	5.00(0.65)	a: <i>t</i> = -.88, <i>p</i> = .38 b: <i>t</i> = -0.86, <i>p</i> = 0.39 c: <i>t</i> = -0.71, <i>p</i> = .48 d: <i>t</i> = -0.04, <i>p</i> = .97 e: <i>t</i> = 0.18, <i>p</i> = .86 f: <i>t</i> = -0.21, <i>p</i> = .83
Fear related to COVID-19	101	24.82(8.82)	95	25.64(9.91)	91	25.39(8.61)	96	25.74(8.33)	a: <i>t</i> = 0.61, <i>p</i> = .54 b: <i>t</i> = 0-18, <i>p</i> = .86 c: <i>t</i> = -0.07, <i>p</i> = .94 d: <i>t</i> = -0.45, <i>p</i> = .65 e: <i>t</i> = -0.74, <i>p</i> = .45 f: <i>t</i> = 0.28, <i>p</i> = .78
Empathy	101	62.02(15.42)	95	65.00(7.24)	91	64.00(9.57)	96	62.06(13.21)	a: <i>t</i> = 1.71, <i>p</i> = .09 b: <i>t</i> = 0.80, <i>p</i> = .42 c: <i>t</i> = 1.90, <i>p</i> = .06 d: <i>t</i> = -1.05, <i>p</i> = .29 e: <i>t</i> = -0.02, <i>p</i> = .98 f: <i>t</i> = -1.14, <i>p</i> = .25

Note: a = Control vs Cognitive, b = Control vs Emotional, c = Control vs Social; d = Cognitive vs Emotional, e = Cognitive vs Social; f = Social vs Emotional

Figure 1S

COVID-19: an extreme case

5 August 2020

The COVID-19 is an infectious respiratory disease that already caused many deaths throughout Italy, around 60 Italians out of 100.000 died because of this virus this year.

Two days ago, it was reported a heavy case of COVID-19, a young student from Selvazzano was taken to the University Hospital of Padova. This virus affects also young people and Luisa (invented name) is one of many examples. She is 27 years old and works as a bar tender after school. She was taken to the hospital in a critical condition. Some days after the COVID-19 diagnosis, her health condition has rapidly worsened and 2 days ago she was taken to the hospital following a severe respiratory crisis. She is currently intubated in intensive care.

Corresponding Image

The doctors report: "We are obliged to keep her in constant monitoring units since her condition is unstable and extremely critical and can worsen at any moment".

Luisa is very enthusiastic about life and full of projects for future. Her family and friends were very worried, and they decided to start a fundraiser with the hope of helping Luisa to return to her live. The association's goal is to help all COVID-19 patents and it intends to support medical research and psychological care for patients and families. It is possible to donate by calling the following number: 12587. We hope that Luisa and other young people like her will receive the best care and needed support so that they are able to confront this dangerous disease.

Figure 1S. Example of charity scenario vignettes. Participants were requested to read an article on a serious case of COVID-19 and flu patients for whom a charitable organization was collecting funds (there was no time limit for reading) after which they were asked to self-report on willingness to help and donate. Both the COVID-19 and flu articles had the same length and structure. Participants were presented similar texts for the COVID-19 and flu conditions, only the name of the disease and related statistics in the first phrase were changed per each condition. The pictures and patients' names were balanced per gender (e.g., male participants were presented a male patient case) and condition. *All the human images were chosen from the Psychological Image Collection at Stirling (PICS; pics.stir.ac.uk) which are free for research use.

Endnotes

¹ The present data have been collected during the 2020 pandemic of COVID-19, therefore this variable was accounted for in the manuscript both controlling for fear of COVID-19 and including families of COVID-19 patients as potential targets for donations.

² To select the most adequate condition to be compared with a severe COVID-19 illness a pretest was conducted during the summer (July-August 2020). During the pretest, COVID-19 was compared with flu, pneumonia, and melanoma (given the relatively comparable prevalence and mortality rates of these illnesses in Italy) in terms of affective response to the illness, perceived danger, and probability of getting the illness and reported importance to help patients suffering because of the illness. Results showed that flu was the most comparable illness with the COVID-19.

³ The IAPS stimuli manipulated for the emotional stress were labeled with the following slide numbers; and the sequence was kept similar: 2141, 2095, 3030, 3530, 2703, 3053, 2800, 3080, 9940, 3170, 6300, 3140, 2799, 3160, 6230, 3213, 2683, 3215, 3059, 3185, 6212, 3101, 2780, 3102, 6210, 3195, 3230, 3005.1, 3103, 3001, 3261, 6250, 3216, 2205, 9910, 9911. While for the reminder the following stimuli were used: 6840, 3266, 9050, 9007, 9183, 9040, 9413, 3350, 9414, 6623, 9491, 9432, 9430, 3300, 9000, 9810.

⁴ In support to the conclusion that stress induction was not influenced by the pandemic, the same pattern of results was found when controlling for the fear of COVID-19 scale.

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