THE EFFECTS OF RECEIVED SOCIAL SUPPORT ON POSTTRAUMATIC STRESS SYMPTOMS AND SOCIAL ADJUSTMENT OF NEW ZEALAND AND PHILIPPINE EMERGENCY RESPONDERS

A thesis presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Psychology at Massey University, Wellington, New Zealand

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To my dad, Jack, who thought it would be nice for me to have a PhD

Abstract

Emergency response work is associated with a wide range of psychological outcomes. One of the most commonly observed psychological consequences is posttraumatic stress symptoms (PTSS). In addition, traumatic exposure of these types are also seen to affect social adjustment, which may take the form of changes in satisfaction with social relationships and performance of social and occupational roles. In these highly stressful conditions, social support, behaviours and social interactions that provide actual assistance and embed people in loving and caring social networks (Hobfoll & Stokes, 1988), has been shown to be associated with favourable consequences. This research was conducted to test the effects of social support on PTSS and social adjustment in emergency responders – those who are mandated to protect and preserve life, property, and the environment (Prati & Pietrantoni, 2010) in the aftermath of emergencies and disasters.

This thesis specifically focusses on received social support, which is the situational-environmental facet of social support. The first two manuscripts are meta-analyses on the associations of social support on psychological outcomes, to chart the topography of research in the area. Manuscript One is a systematic review and meta-analysis on the associations of social support on various psychological outcomes in emergency responders working in disasters. Manuscript Two is a meta-analysis on the influence of social support on posttraumatic stress symptoms in emergency responders, in general. In both meta-analyses, differential effects of social support were found, but there was a domination of studies on perceived social support and a scarcity of literature on received social support.

Manuscripts Three through Five, which cover the results, then focussed on the association of received social support in 223 emergency responders from New Zealand ($n = 195$) and the Philippines ($n = 28$). Manuscript Three tested the main and moderating effects of received

social support on PTSS while Manuscript Four tested its effect on social adjustment. For both studies, the effects of the different sources (i.e., family, peers, supervisor) and forms (i.e., emotional, tangible, informational) of received social support were also tested. Furthermore, to understand the protective assistance process between received and perceived social support, Manuscript Five tested the mediating effects of social support effectiveness and negative consequences on the relationship between received and perceived social support.

The results of these studies highlight three key points. First, received social support is consistently shown to have main effects on PTSS and social adjustment. Second, reverse buffering effects were observed only in received supervisor support on PTSS. Third, support effectiveness and negative consequences do not mediate the link between received and perceived support in emergency responders. These findings suggest the limits of the effectiveness of social support on psychological outcomes, but at the same time, also suggest the potential of this naturally-occurring intervention element to enhance positive outcomes.

Preface

This PhD thesis is composed of five manuscripts. The first manuscript is a meta-analysis on social support and psychological outcomes in disaster responders. The second manuscript is a meta-analysis on social support and posttraumatic stress symptoms in emergency responders. The third manuscript focusses on received social support and posttraumatic stress symptoms in New Zealand and Philippine emergency responders. The fourth manuscript investigated the main and moderating effects of received social support on social adjustment. Finally, the fifth manuscript focusses on the mediation of received and perceived social support.

Due to the publications format of this thesis, there will be repetition of ideas in the different chapters, particularly in the introductions and methods sections of each manuscripts. Furthermore, a general references section at the end of this thesis contains all the literature cited in the different chapters. The ideas presented here are totally mine, but my supervisors provided guidance in the planning of the research and in the gathering and analysis of the data, in the development and structuring of arguments, and in the choice of appropriate journals for publication.

Acknowledgements

I remember being asked as a kid: “What do you want to be when you grow up?” Truth be told, I wanted to be many things—to be a doctor was one of them—but I responded, “I want to be a writer.” Many years later, I found myself strapped in a postgraduate suite, writing day in and day out. Be careful what you wish for. For three years, I read and wrote about social support, and the process of being a (social support) writer was just as Hemingway said—it was nothing: all I had to do was to sit down at a computer and bleed! It was haemorrhaging. Yet several people came to my aid to prevent me from bleeding out. This section is to thank those who have helped me navigate the PhD terrain and produce this piece of work.

My PhD supervisory team made sure I did not get lost in the process. I am very fortunate to have Dr Ian de Terte as my primary supervisor. The PhD journey can be very daunting, and it really helped to have a supervisor who always had my back and who always believed in me especially in the many times when it was so difficult to believe in myself. Prof. Krzysztof Kaniasty helped me shape my ideas about social support. I have always admired the elegance of Krys’ writings—how he marries the scientific and the literary—and under his guidance, I started finding my voice as a science writer. Prof. Christine Stephens is an excellent editor. Her comments are always spot on, specific, and constructive. I will always remember her words when I write: “what’s your story?” My supervisory team made me realise that I am such a “tense” writer (I will always try to remember my tenses).

I wrote the story, but several people gave me something to write about. This thesis would literally be nothing without the aid of the New Zealand Scholarships under the Ministry of Foreign Affairs and Trade. Thank you, Rune Ylade (MFAT Philippines), for making sure Filipino NZ scholars like me are taken care of. This research would be impossible without the participation of the emergency responders in New Zealand and in the Philippines. Zoe Mounsey and Dr Raj Prasanna connected me with emergency responders in New Zealand,

and the New Zealand Professional Firefighters Union endorsed my study to its members. Junalie Katalbas, Pierra Lamayo, and Marianne Sioson aided me during the pre-testing and data gathering in the Philippines. Dr Marshaley Baquiano, Dr Simon Bennett, and Dr Divine Salvador reviewed my proposal to ensure my study is culturally sensitive. Dr Jhoanne Gatpatan provided advice on statistics. Harvey Jones provided fantastic technical support during the data gathering stage. Our college staff, Megan Burnett and Claire Grant helped with logistics, and more.

Writing this thesis was a rough journey, but several people provided me cushion throughout the bumpy ride. The Massey University International Student Support Office was always there to provide support when needed. I am especially grateful to Jamie Hooper and Cherie Wu. My friends at the University of the Philippines (Dr Gay Defiesta, Bernice Landoy-Mamauag, Moniq Muyargas, Cristabel Parcon, Brian Ventura) provided practical and emotional support. Austina Go, Pura Ordoña, and Rane Joguilon always had the listening ear. My flatmates, Hanny Mediodia and Oscar Ceballos, were very understanding when I was in the middle of the thesis blackhole. Wellington postgrad friends, like Theresa Castro, Rapha Perez, Geo Robrigado, and Nishtha Singh Dutta, were very compliant test subjects for my culinary experiments during stress cooking/baking episodes. Palmerston North friends, Froilan and Michelle Ayaquil, Tracy Decena, Dr Dominic Lomiwes, Arnel and Pau Pocsedio, and Reez Tiongson hosted me during my visits to Palmy. Auckland postgrad friends (e.g., Harold Aquino, Analyn Avila, Marilyn Castiño, Ryan Truong) went out of their way to keep me company during my visits to Auckland. The FilCoro helped me rediscover my love for music and made me feel at home in Welly.

What started at the 5D Scholars Lounge as an informal discussion group became a very dynamic and supportive PhD community. PhD friends, like Dr Nancy Brown, Victoria Quade, and Marion Tan, and the Basin Noodle House lunch crew (George Ding, Dr Murray

MacCrae, and Dr Leon Salter) created a space for healthy exchange of ideas and for fostering camaraderie. Block 7 mates (e.g., Ammar Al-Maani, Sara Chettiar, George Guthrie, Tam Matthews, Christie Satti, Dr Alexia Sweet, Daniella Zhao) made a home out of the postgrad suite. These people have helped me keep it together throughout this arduous experience.

My family was a significant part of the PhD journey. My mom has been very understanding of the immense pressure I was on. My siblings, Yuyan, Annie, JJ, and Jolo have been very supportive. In the course of finishing this degree, I lost my dad. I hope he is proud of me. Yet I also gained a nephew. Being an uncle is a badge I will always wear with pride.

I came to New Zealand to get a PhD, but I also found two very good friends along the way. Doing a PhD can be very lonely, and I thank Hong An Nguyen for keeping me company and for looking after me during some of these loneliest times. My best friend, Nick Balintec, has always been there as editor, driver, financial advisor, confidante, travel buddy, among other roles. He has kept me grounded in moments when things got overwhelming. I sought to learn about psychology. I got that, but I also learned to be human.

In the process of learning and writing about social support, I discovered my own. I learned that there people who are ready to help. On the other hand, I have also realised that I can be a terrible social support provider. However, there is redemption—that effective social support provision is a skill, it can be learned, and that I can do better.

Maybe working on this thesis made me a writer. Maybe not. However, more importantly, this whole experience made me a better person. Writer or not, I think I have grown.

Table of Contents

List of Figures

List of Tables

Chapter One: Introduction

Humans are social beings, and it is argued that the way our species, particularly the brain, has evolved is largely influenced by the complexities of living with a social group (Shultz & Dunbar, 2007). For example, those who were part of a social group are theorised to have less likely been attacked by animals and mostly likely have had more food as a consequence of being with others, compared to their more socially isolated counterparts (Lakey & Cohen, 2000). Social environments have shaped human behaviour through time, underscoring the importance of interpersonal relationships and interactions, not only in surviving, but also in thriving in an ever-changing world.

Social support

"A broom is sturdy because its strands are tightly bound." - Filipino proverb

It is an age-old wisdom that having social support is beneficial to health and wellbeing. However, mainstream scientific inquiries on the health benefits of social support began only in the 1970s, when Sidney Cobb, John Cassel, and Gerald Caplan, dubbed as fathers of social support, paved the way for investigations of this construct (Miller, 2003). Cobb (1976), then president of the American Psychosomatic Society, highlighted the idea that social support has the effect of dampening the negative effects of stress. This sparked interest in conducting social support studies (e.g., Gore, 1978; Kaplan, Cassel, & Gore, 1977; LaRocco, House, & French, 1980). These investigations went from identifying the benefits of social support, to uncovering its complex nature (e.g., Chen, Kim, Mojaverian, & Morling, 2012; Kim, Sherman, & Taylor, 2008; Kossek, Pichler, Bodner, & Hammer, 2011; Park et al., 2013; Riley & Eckenrode, 1986; Taylor et al., 2004).

The term "social support" encompasses a wide range of behaviours and interactions. This meta-construct conceptually refers to "any process through which social relationships might

promote health and well-being" (Cohen, Gottlieb, & Underwood, 2000, p. 4). Hobfoll and Stokes (1988; Kaniasty & Norris, 2009) comprehensively defined the construct as a set of social interactions and behaviours that provide actual assistance and embed people into a network of loving and caring social relationships, with help readily available when needed. This definition highlights the spontaneous and naturally-occurring nature of social support, as well as its three major facets. Received social support is a set of functional support that is actually provided, or from the point-of-view of the recipient, that which is actually received. More specifically, Wills and Shinar (2000) defined it as supportive "functions that are reported to be *recently provided*" (p. 87). Perceived social support, on the other hand, refers to the perception of availability, if needed, of these supportive functions. Perceived social support is also the appraisal of the quality of support available in times of need. Social embeddedness, used interchangeably with social integration, refers to the affiliation in a network of supportive social relationships.

The main effects and the stress-buffering models

There are two major models of how social support affects psychological outcomes: the main effects and the stress-buffering models. The Main Effects Model conceives social support and related constructs such as social integration, peer pressure, and social networks as having direct effects on health (Cohen et al., 2000; Thoits, 1982). This model suggests that social support in itself contributes positively to physical and psychological well-being, regardless of the stress exposure. The Stress-buffering Model, on the other hand, suggests that social support dampens the effects of stressful events on psychological outcomes (Cohen & Wills, 1985), regardless of the presence of main effects on psychological health (Kaniasty & Norris, 2009). In other words, social support gains its value in relation to psychological outcomes in the context of stress—that when one faces adversity, having social support may lead to better outcomes.

Social support in disasters and emergencies

The complexity of social support as a construct is evident in the context of disasters and emergencies (Kaniasty, 2012; Kaniasty, de Terte, Guilaran, & Bennett, 2019; Kaniasty & Norris, 2000, 2009; Prati & Pietrantoni, 2010b). Research on social support in disasters and emergencies evolved from studies on stress and health outcomes. Exposure to these highly stressful conditions may result in negative psychological and social consequences (McFarlane, Van Hooff, & Goodhew, 2009; Norris et al., 2002). On the other hand, there is extensive documentation of the positive effects of having social support in these catastrophic times (e.g., Hobfoll et al., 2007).

However, there are additional layers of complexities in terms of the effectiveness of social support in disaster and emergency settings. First, in times of disasters, there is spontaneous mobilization of social support. Yet, not everyone receives, or has access to, the same quantity or quality of social support. Those perceived to have greater need of support are usually provided with more support (e.g., people who had their houses completely destroyed by typhoons are usually provided more help than those who did not suffer as much), but those with better pre-disaster (social) resources also have better access to post-disaster support (e.g., people with a large network of friends and supportive peers pre-disaster have better access to assistance post-disaster—from their social network—than those with a smaller supportive social sphere). Second, social support, just like other resources in post-disaster settings, are finite and may deteriorate overtime (Kaniasty & Norris, 1995b, 2004). This phenomenon of support deterioration has been observed after Hurricane Hugo and Hurricane Andrew (Norris & Kaniasty, 1996), where perception of support was found to erode after two years. However, these findings also suggest that perceived support deterioration was counteracted by post-disaster received support mobilisation. Third, there are individual and social characteristics that may influence social support in these contexts (e.g., Brooks, Dunn,

Amlôt, Greenberg, & Rubin, 2016). For example, Kaniasty and Norris(2000) found that in post-disaster contexts, ethnicity (along with the relative needs and the pre-and-post-disaster resources associated with these ethnicities) affected the level of comfort in seeking for social support. So as much as social support has influence over psychological consequences in the aftermath of disasters and emergencies, these person- and situation-related support dynamics should be taken into account when estimating the direction or the extent of its effect.

Social support as a resource

In examining the effectiveness of social support, there is a need to consider provider characteristics, recipient characteristics, contextual factors, and the nature of social support (Uchino, Carlisle, Birmingham, & Vaughn, 2011). One perspective of looking at social support is from the lens of resource-based stress theories. One of the most famous examples is the Conservation of Resources (COR) model, which explained the dynamics of social support as a resource (Hobfoll, 1989).

The COR model operates under these principles: (1) that people behave in order to optimise what the circumstances have to offer, as in resource gain; and, (2) people behave in order to minimise losing resources. Based on these assumptions, psychological distress is experienced when there is a threat of resource loss, when there is actual resource loss or depletion, or when there is failure of gaining resource after considerable investment (Hobfoll, 2001). For example, not receiving support from friends after investing a significant amount of time and energy may result in experiencing emotional pain. It is also experienced when one feels the need to replenish important resources after having used them all up, or when there is failure to regain resources after trying to replenish them (Benight, McFarlane, & Norris, 2006).

From the COR perspective, social support is finite and unstable, and is subject to resource loss. It may also be a double-edged sword (Hobfoll, 1989; Wills & Shinar, 2000). For example, social support that buffers stress, but which makes the individual dependent on it (e.g., "too much" social support), may bring psychological relief but may also hamper the individual's coping capacity (Benight & Bandura, 2004)—an outcome that is counterproductive in the long run. Depending on the use or utilisation, the context, the provider-recipient characteristics, provision of social support may backfire.

The COR model has been elaborated and contextualised in disaster settings by the Social Support Deterioration Deterrence (SSDD) model (Kaniasty & Norris, 1995b, 2004; Norris & Kaniasty, 1996). This model identifies the differential effects of the various facets of social support, as well as the patterns of support mobilisation and deterioration in the aftermath of disasters. As the model explains, disasters deplete individual and community resources; hence, creating a need for external aid. However, distribution of, and access to, social support resources are not equal in all segments of the affected population. More severe exposure may mobilise more support (relative needs), but more pre-disaster resources may mean better access to post-disaster support (relative advantage).

The SSDD model unifies the concept of "resource caravans" (Hobfoll, 2012, 2014) with the interrelationship of the different social support facets. The concept of resource caravans suggests that certain characteristics, such as status and assets, influence the quantity and quality of other resources acquired, including social support resources. For example, people with high social embeddedness have more access to support, which may provide them more access to other resources such as money and other forms of practical aid. One resource leads to the acquisition of other resources, creating a chain of further access and acquisition of other resources, like a caravan. In the context of emergencies and disasters, individuals with better pre-disaster resources are more likely to have better post-disaster resources, and

therefore, would be less vulnerable to the negative impacts of these catastrophic events compared to individuals with fewer pre-disaster resources (Hobfoll, 2012). The SSDD model also conceptualizes perceived social support as a mediator of received social support and psychological outcomes, through protective assistance and appraisal processes. In this model, social support is both a pathway to, and a buffer of, the link between traumatic exposure and psychological outcomes.

The effectiveness of received social support

While perceived social support has consistently been associated with positive psychological outcomes (Prati & Pietrantoni, 2010b), there is inconsistent evidence on the effectiveness of received social support (Maisel & Gable, 2009). As outlined by the SSDD model, received social support influences perceived social support, which consequently effects changes in psychological outcomes. In this model, received support is conceived to indirectly influence psychological change through perceived social support. This path of effectiveness is supported by observations of distal effects (small to medium effect sizes) of received support and proximal effects (medium to large effect sizes) of perceived support (Prati & Pietrantoni, 2010b). Given this relationship, it would be logical to suppose that whereas it has direct effects in itself, received social support that also modifies perceived social support may be considered very potent in influencing psychological outcomes.

Models of received support effectiveness

Several models have attempted to explain the processes that facilitate the effectiveness of received social support. Cutrona and Russell's (1990) stress-support matching hypothesis posits that effective received social support is that which takes a form that matches the need to cope with the stressor, consequently reducing the stressor's effect (Lakey & Cohen, 2000). For example, workers who are exhausted because of too much work may benefit more from

reducing the workload than from receiving words of comfort. Alternatively, the form of support that is incongruent to the demands of the stressor renders supportive actions ineffective.

The stress-support matching hypothesis was later expanded by the Social Support Effectiveness (SSE) hypothesis (Rini & Dunkel Schetter, 2010), which specified the conditions and other antecedents in which received support (framed as "enacted support") becomes effective. Support effectiveness may be influenced by the mobilisation of support in response to the need and the correspondence of support provided to the support needed, which are dependent on several factors such as availability of support providers, strength of support network, and availability of other resources. Operationally, effective support is that which matches the need both in quantity and quality. It is neither too little that it fails to fulfil the minimum need but not too much that it impedes self-efficacy. Effective support is in the form that answers the need, is mobilised easily, and is provided skilfully.

Finally, another expansion of the discussion was offered by Uchino and colleagues (2011). They proposed that the type of stress influences the type of support received, and vice versa. Explained in the context of cardiovascular reactivity and physical health, the Support-Reactivity hypothesis proposed three aspects of received social support that allow it to have a positive impact on physical health. First, this model posited that effective received social support matches the demands posed by the stressor, which is parallel to what was proposed by Cutrona and Russell (1990). Second, this model suggested that received social support is effective if the recipient chose to receive that support. This idea is similar to what was proposed by Rini and Dunkel Schetter (2010) that the support provided should match what the recipient wants. Third, this model proposed that the relationship quality between the provider and the recipient of support also matters. This also runs parallel to the SSE hypothesis, which stated that effective social support is one which comes from a skilful

support provider, is offered without being asked, and is not difficult to obtain. This aspect also highlights the idea that some social support providers may offer better support than others.

These explanations support the direct effects model of received social support. However, received social support, as stated earlier, is also framed with indirect effects. For example, the SSDD model proposed that received social support modifies perceived social support through the process of protective assistance. Protective assistance occurs when received social support maintains or reinforces perception of support, and attenuates its deterioration in the aftermath of disasters. Yet the protective assistance processes that translate received support to perceived support still need to be explored. For example, a meta-analysis on the relationship between received and perceived social support failed to uncover the factors that influence this relationship (Haber, Cohen, & Baltes, 2007).

Received social support effectiveness and ethnicity

Culture has a huge influence on human behaviour and it affects resource-driven behaviour. Culture dictates, not just the value of resources, but also the mechanisms that underlie the distribution, use, and utilisation of resources, including social support (Taylor et al., 2004). Yet, in spite of this idea of social support being highly influenced by culture, there are surprisingly few studies looking at the sociocultural dimension of the construct.

In these few studies, ethnic and cultural differences were observed in terms of social support utilisation, social support preference, and the helpfulness of social support. For instance, one way of categorising cultures is in terms of the degree of individualism and collectivism, which characterises the degree to which the self relates to others. People in collectivistic cultures have a sense of self that is characterised by interdependent-same self while those in individualistic cultures are said to have the independent-different sense of self (Triandis,

1993). It is argued that collectivistic cultures are characterised by the interdependence of relationships, where there is reluctance to inconvenience other people by sharing one's emotional concerns. On the other hand individualistic cultures allow more liberty to discuss feelings with another person (Chen et al., 2012). These differences go beyond the collectivistic-individualistic categorisation. From the perspective of resource caravans, certain ethnicities have associated characteristics that facilitate resource mobilisation and influence resource utilisation. For example, some ethnic groups have more resources than others, or are more comfortable in seeking support than others (e.g., Kaniasty & Norris, 2000). Considering the different models explaining received support effectiveness, these ethnic differences in support quantity or support seeking and utilisation may affect the effectiveness of social support and needs to be investigated further.

Received social support in emergency responders

Emergency responders are professionals tasked in the "protection and preservation of life, property, and the environment" (Prati & Pietrantoni, 2010, p. 403) after emergencies and disasters. They are conventionally categorised into traditional and non-traditional types (Benedek, Fullerton, & Ursano, 2007; Bromet et al., 2016). Traditional responders are those who are mandated to respond in the aftermath of an emergency or disaster (e.g., police, firefighters, emergency physicians). Although these types of responders have more training; hence, better preparation for dealing with traumatic exposure, they are also more constantly exposed to these gruesome events.

On the other hand, non-traditional types (e.g., construction and clean-up workers) are those who are not mandated to respond in the aftermath of these critical incidents, but who respond due to the circumstances, such as in the aftermath of large-scale disasters when human resources are challenged. Unlike traditional responders, these types of responders are not

regularly exposed to emergencies. While they serve to support and complement the tasks of traditional responders (Benedek et al., 2007), they are also mostly inadequately trained to deal with the traumatic elements of emergencies (Brooks et al., 2016). Furthermore, traditional responders are usually embedded in organisations that have support systems designed to help them cope with emergencies (although whether these systems work or not is another story). These types of supportive systems are usually not present in non-traditional responder organisations.

Emergency responders, posttraumatic stress symptoms, and social adjustment

Emergency responders may experience a variety of psychological and social consequences as a result of their work. Posttraumatic stress symptoms (PTSS) are some of the more widely observed consequences following exposure to disasters or emergencies (Norris & Elrod, 2006). These symptoms, which are anchored on exposure to traumatic events, are clustered into four: re-experiencing, avoidance, negative alterations in mood and cognition, and hyperarousal (American Psychiatric Association, 2013). Being regularly exposed to critical events, emergency responders are at risk of developing PTSS, with prevalence higher than that of the general population (Caramanica, Brackbill, Liao, & Stellman, 2014; Harada et al., 2015). Some emergency responders may meet the diagnostic criteria for posttraumatic stress disorder (PTSD), a full diagnosis of which is given when PTSS symptoms are experienced at least six months after the traumatic exposure (for the full diagnostic criteria, see Appendix A).

Aside from its effect on psychological outcomes, emergency response work is also seen to be affected in terms of social adjustment. Social adjustment is defined as a dimension of social wellbeing that relates to satisfaction with social relationships, performance of social and occupational functions, and adjustment to the environment (Larson, 1993). Problems in

social adjustment may manifest as the deterioration of social relationships (Alvarez & Hunt, 2005; Gibbons, Hickling, & Watts, 2012), or in clinical terms, as impairment in social and occupational functioning. However, unlike PTSS, social adjustment is not as extensively investigated.

Social Support in emergency responders

Emergency and disaster response work is, without a doubt, stressful, and evidence points to social support as one of the key factors that help first responders survive or even thrive in this environment. Generally, social support is seen as a key component in post-disaster psychological coping (Hobfoll et al., 2007). In Hobfoll et al.'s five key principles of psychosocial recovery, social support is mostly reflected in the Promotion of Connectedness, although it could also influence the other four principles (i.e., a sense of safety, calming, a sense of self-and-community efficacy, hope). For example, social connectedness was found to be very useful in providing knowledge necessary for survival (e.g., where to evacuate, when will aid arrive) and also links people to other forms and sources of social support (e.g., connecting to people with resources or skills that could solve one's problem).

These principles are also thought to apply to emergency responders, but the extent of its effectiveness is yet to be charted. With the exception of a few, most studies on social support in emergency responders focus on perceived social support (Guilaran, de Terte, Kaniasty, & Stephens, 2018). However, there is considerable reason to explore the effectiveness of received social support. Along with social embeddedness, received social support is the facet of social support that is of environmental/external nature; which means it can be adjusted to effect the desired psychosocial outcome. The inconsistencies in the effectiveness of received support, as opposed to the well-established beneficial associations with perceived support, may also be due to several factors influencing the strength and/or direction of its effect.

Hence, there is also a need to study the differential effects of the different components of received social support.

Aims of the study

There is a consensus that social support is generally beneficial especially in times of emergencies and disasters (e.g., earthquakes, terror attacks). Arguably, social support is a potent intervention component in post-emergency situations. However, as it will be argued, there are certain conditions in which these supportive actions take effect, and that the extent to which these supportive actions can modify psychological outcomes are also within bounds. Where social support is viewed as an intervention component, received social support—arguably the externally modifiable facet of social support—has not been given enough focus in the scientific literature. The present study, then, essentially tested the associations of received social support and its different components on psychological outcomes in the context of emergency responders. Specifically, this thesis aims to:

1. test for the main effects of received social support on posttraumatic stress symptoms and social adjustment in emergency responders.
2. test for the moderating effects of received social support on posttraumatic stress symptoms and social adjustment in emergency responders.
3. identify factors that explain the relationship between received social support and perceived social support in emergency responders.

Thesis outline

The rest of this thesis is composed of five manuscripts and a general discussion that links all the findings together. To explore the associations of the different components of social support with psychological outcomes on emergency responders based on the literature, two meta-analyses were conducted. The first (Chapter Two) is a systematic review and meta-

analysis of the differential effects of the different components of social support on psychological outcomes in disaster first responders. The second manuscript (Chapter Three) is a meta-analysis of the differential effects of social support on posttraumatic stress symptoms (PTSS) on emergency responders. This is followed by a personal reflection (Chapter Four) on the results of the meta-analyses, which informed the conduct of the main study. The next two manuscripts report tests of the main and moderating effects of received social support on social psychological outcomes. The third manuscript (Chapter Five) reports tests of the differential effects of the various received social support components on PTSS. The fourth manuscript (Chapter Six) examined the main and interaction effects of received social support on social adjustment. Finally, the fifth manuscript (Chapter Seven) explored the mediating factors linking received social support and perceived social support in emergency responders. After which, a general discussion and conclusion is offered, weaving the findings of the 5 manuscripts together.

Chapter Two: Psychological outcomes in disaster first responders: A systematic review and meta-analysis of the effect of social support[1]

Abstract

Disaster response work is associated with various psychological outcomes. In post-disaster conditions, social support is generally observed to impact mental health, particularly for survivors. This review was conducted to survey the extent of the effectiveness of the different facets of social support on disaster responder groups. Published quantitative social support studies on police, emergency medical responders, rescue and recovery workers, firefighters, and military responders were searched in various academic databases using keyword searches, a reference list search, and a citation search that resulted in 24 studies with 90 effect sizes being included in the final data base. Most studies measured perceived social support and negative outcomes. Articles were coded and effect sizes were averaged using the Hedges-Vevea Random Effects model. Nineteen categories of psychological outcomes (for example, anxiety, depression, posttraumatic stress symptoms, and psychological distress) and eight classifications of support were coded. Generally, social support was found to be associated with anxiety, burnout, depression, job control, job satisfaction, psychological distress, turnover intentions, and work engagement, with mean effect sizes from -0.36 to 0.57. Social support correlated with outcomes in police responders and rescue and recovery workers. This review discusses the breadth of effect of social support, as well as other elements, such as temporal factors, that may affect the effectiveness of social support in disaster responders.

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[1] Guilaran, J., de Terte, I., Kaniasty, K., & Stephens, C. (2018). Psychological outcomes in disaster first responders: A systematic review and meta-analysis on the effect of social support. *International Journal of Disaster Risk* Science, 9(3): 344-358. doi: 10.1007/s13753-018-0184-7

Introduction

Disasters are collective experiences that affect people at the community and individual levels. Exposure to these events is associated with both negative (Bonanno, Brewin, Kaniasty, & La Greca, 2010; Fullerton et al., 2015; Goldmann & Galea, 2014) and positive (e.g., positive effects on interpersonal closeness, see Bonanno et al., 2010; resilient outcomes, Harada et al., 2015) psychological outcomes, which are observed in the general affected population. These outcomes are also observed in indisviduals who respond and provide assistance in the aftermath of disaster events (Benedek et al., 2007; Bromet et al., 2016; Fullerton et al., 2013). In studies that have investigated the correlates of these psychological outcomes, social support is found to be one of the most reliable factors associated with fewer negative and more positive outcomes. Hobfoll and Stokes (1988)—and later, Kaniasty and Norris (2009)—highlighted three facets of this construct: (1) receipt of actual assistance; (2) perception of availability of support; and (3) integration in a network of caring individuals. These facets of support are viewed to make unique contributions to psychological outcomes in the aftermath of disastrous events.

Notably, the Social Support Deterioration Deterrence (SSDD) model developed by Kaniasty and Norris (1993, 1995, 2009) suggests that perceived social support directly affects psychological outcomes while received social support influences perceptions of support; thus, receipt of support indirectly affects psychological outcomes. The SSDD model also posits that mobilization and utilisation of social support are unequal and inequitable in times of disasters. Mobilization of social support is influenced by pre-disaster factors such as social status and other resources, which dictate the relative advantage/disadvantage in receiving social support. Although people with more severe exposure to disasters are typically expected to experience more psychological distress, they are also likely to receive more social support because they are perceived to need it more than those with less severe disaster exposure.

That social support is beneficial in the aftermath of disasters is well documented (Norris & Elrod, 2006; Norris et al., 2002), but the degree to which it is beneficial for disaster responders is yet uncharted. Disaster responders are professionals tasked with the "protection and preservation of life, property, and the environment" (Prati & Pietrantoni, 2010, p. 403) in the aftermath of catastrophic events. Aside from being support providers, these individuals are also support recipients. In addition, responders usually operate under a structure that embeds them in a group of individuals with shared experiences. Thus, in terms of social support, disaster responders have the unique context of systematically providing support while arguably systematically receiving support themselves. The gap lies in knowing how these support-related circumstances affect the association between social support and psychological outcomes.

This article presents a general picture of social support investigations among disaster responders. Social support is considered as one of the cornerstones of psychological recovery (Hobfoll et al., 2007), where increase in support is usually associated with lower risk for psychopathology (Goldmann & Galea, 2014). But the effectiveness of social support is influenced by several factors, such as the sources of support (Halbesleben, 2006) and culture (Chen et al., 2012). Temporal elements are also crucial in the context of disasters: social support is observed to deteriorate over time (Kaniasty & Norris, 1995b). This article identifies the different psychological outcomes associated with social support in disaster responder groups, and summarizes the strength of social support-outcome associations, while also considering some of the influencing factors mentioned earlier in this paragraph.

A number of meta-analyses have shown the link between social support and psychological outcomes. Meta-analyses on the correlates of posttraumatic stress disorder (PTSD) showed lack of social support as a risk factor, and having social support as a protective factor (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). These studies

only focussed on PTSD, however, and did not specifically target social support in disaster first responders. The meta-analysis by Prati and Pietrantoni (2010), on the other hand, targeted social support and first responder mental health outcomes. The current study differs from previous work in three major aspects: (1) our work specifically explored the strength of association of social support and psychological outcomes in the context of disasters; (2) this study casts a wider net in terms of how social support is defined and how psychological outcomes are covered; and (3) we attempt to synthesise these associations in terms of facets of support, type of responder, type of outcome, and support and outcome measurement time lags.

Article selection and inclusion

Articles were identified through several methods (Fig. 1). A Boolean keyword search in PsycINFO (*n* = 138), PubMed (*n* = 276), and Web of Science (*n* = 193) was performed using the social support keywords: "social support," "received support," "perceived support," "social embeddedness," "social integration," "emotional support," "informational support," "practical support," "instrumental support," "social network," and "assistance"; responder keywords: "emergency first responder," "first responder," "emergency responder," "emergency worker," "police," "military," "fire fighter," "ambulance," "red cross," "red crescent," and "disaster responder"; and "disaster*." The 607 abstracts were then screened using the following criteria: (1) they must be quantitative studies on disaster first responders; (2) each must explicitly measure social support; (3) every study must measure at least one psychological outcome; and (4) the studies selected must also be carried out in the context of a "disaster," which was defined using the Emergency Database (EM-DAT) definition (Guha-Sapir, Hoyois, & Below, 2016). Studies that did not meet these criteria were excluded. This reduced the data base to 20 articles. After removing eight duplicates, the remaining articles were added to the 10 articles at hand to constitute an initial article pool. These articles at

hand were those related to the topic but did not show up in the article search. The reference lists of these 22 articles were examined to search for additional studies for possible inclusion. No new studies were found using this method. Using Google Scholar, manuscripts that cited the screened studies were checked for possible inclusion in the review. This resulted in 13 additional articles. One manuscript was excluded due to non-response from the author upon request for the full text. The full-text articles were then inspected for eligibility using the same criteria used in the screening procedure, and 10 potential articles were excluded, which resulted in 24 studies being included in the final review.

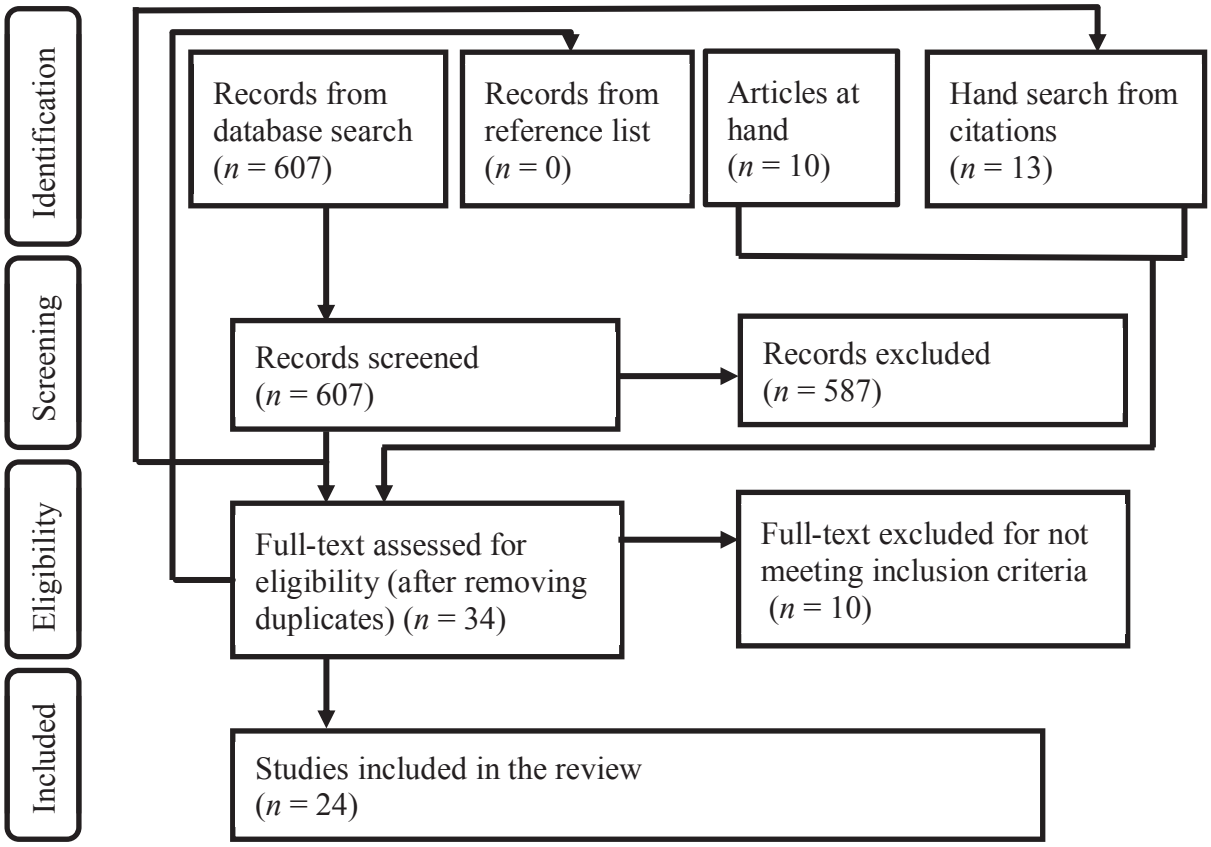

Fig. 2.1. Process of article search, screening, and inclusion (Moher et al., 2009) of studies used in a meta-analysis of psychological outcomes in disaster responders. Screening of the manuscripts used the following inclusion criteria: (1) quantitative studies on disaster responders; (2) studies that explicitly measure social support; (3) studies that measure at least one psychological outcome; and (4) studies in the context of a disaster. The following exclusion criteria were applied: (1) studies where social support was in the form of formal support, such as psychotherapy; and (2) studies where social support is the outcome rather than the predictor.

Effect sizes on formal support, such as debriefing and psychotherapy, were excluded because this article is focussed on social support from nonprofessional support providers. Also excluded are studies where social support is the outcome variable. An exception was made for Schwarzer et al. (2016), where social support and the psychological outcome variables were measured at the same time, despite social support being framed as an outcome.

Coding of articles

Articles were coded according to year of publication, responder/sample, sample size, disaster, social support measure, outcome measure, and effect size. Responder types were clustered into five based on the number of studies: emergency medical responders; firefighters; police; rescue and recovery workers; and, others, which includes military responders and disaster responders that were aggregated (for example, combined police, firefighters, and emergency medical responders). Social support measures were then categorized according to the facet of support: general/undifferentiated social support, received social support, perceived social support, social support need, social support utilisation, lack of support, and negative support. Scales that measured social support as a global construct were categorised as general/undifferentiated social support. Scales that measured absence of social support were categorised as lack of support. Scales that measured social support in the form of unsupportive social interactions, support dissatisfaction, and relational strains were categorised as negative support. Measures of frequency of contact, time spent with others, and those that are relationship-based were coded as general/undifferentiated support. Social support-seeking and social-support coping were coded under support utilisation. Outcomes were also coded as positive or negative psychological outcomes. Absence or reduction of negative outcomes/symptoms were coded as positive outcomes.

Variations in the time lag between the disaster occurrence and the measurements were observed. This prompted the addition of two codes. First is the disaster-social support measurement time lag, which is the number of months between the disaster and the measurement of social support. A pre-disaster measurement was given a negative code (for example, measurement at 10 months before the disaster was coded "-10"). Another is the social support-outcome measurement time lag, which is the number of months between the measurement of social support and the psychological outcomes. Studies where social support

and the psychological outcome were measured concurrently were given a code of "0." In cases where measurement spanned for several months, or was done in two time points, the median number of months was derived. One week was coded as "0.25"; 3 weeks, "0.75."

Calculation of effect sizes and method of meta-analysis

A significant number of studies included in the review have multiple measures of social support and psychological outcomes, some with measurements in more than one time points. A unique combination of social support type, psychological outcome, and social support / outcome measurement time lag was considered one effect size. Within study effect sizes were combined using the Fixed-Effects model (Hedges & Olkin, 1985; Hedges & Vevea, 1998) because this method limits the generalizability of the combined effect only to the study sample. The meta-analyses of the different study effect sizes were conducted using the Hedges-Vevea Random Effects model (Hedges & Vevea, 1998) as, in contrast to the Fixed-Effects model, combined effect sizes using this approach allows for generalization of effects to populations outside the study. The Pearson Product Moment Correlation Coefficient was used as the base effect size as it was the most common effect size across the different studies, and is less prone to interpretation error (Field & Gillett, 2010). Odds ratios were transformed to Pearson's r correlation coefficient using Eq. 1 (Field & Gillett, 2010), where $r = Pearson\ correlation\ coefficient$ and $OR = odds\ ratio$. Beta weights were converted to Pearson's *r* correlation coefficient using Eq. 2, which was derived from Eq. 3 (Gardner, 2010), where $t = \frac{b}{SE_b}$, $r^2$is the overall coefficient of determination, *N* is the sample size, and p is the number of predictors,

$$r = \frac{OR^{0.5}-1}{OR^{0.5}+1} \quad (1)$$

$$r = \sqrt{\frac{\left(\frac{b}{SE_b}\right)^2(1-R^2)}{N-p-1}} \quad (2)$$

$$r^2 = \frac{t^2(1-R^2)}{N-p-1} \quad (3)$$

Heterogeneity of effect sizes was tested using the Chi-square test of homogeneity, with *df* = *n* – 1. Data were analysed using Field and Gillett's (2010) SPSS syntax.

Results

Twenty four studies with 90 effect sizes were included in the final analysis (for a summary, see Table 1). Publication years range from 1995 to 2017, with more than 50% of the studies published after 2010. Police officers were the most researched disaster responders, studied by more than 76% of the studies reviewed. Thirty-three percent of the studies were on the 9/11 Attack, making it the most studied disaster. More than half of the studies were conducted in the United States.

Table 2.1. Summary of studies included in the review

Authors (Year)	Design	Time Frame*	Sample (*n*)	Disaster/Location	Social Support Measures	Outcomes Measures
Alvarez and Hunt (2005)	Longitudinal[a]	38 days[b]	Rescue workers (114)	9/11 Attacks, USA	Interpersonal Support Evaluation List (Cohen et al., 1985)	Beck Anxiety Inventory (Beck et al., 1988), Beck Depression Inventory-II (Beck et al., 1996), Brief Symptom Inventory (Derogatis & Spencer, 1993), PTSD Symptom Scale (Foa et al., 1993)
Ask and Gudmundsdottir (2014)	Longitudinal	13 months	Rescue workers (130)	Fireworks factory disaster, Denmark	Crisis Support Scale (Joseph et al., 1992)	Harvard Trauma Questionnaire (Mollica et al., 1992)
Bacharach and Bamberger (2007)	Cross-sectional	n.s.	Firefighters (1,110)	9/11 Attacks, USA	Supervisory support[c]	Depression Anxiety and Stress Scale (Antony et al., 1998), Impact of Event Scale-Revised (Weiss, 2007)
Biggs et al. (2014)	Longitudinal	11 months	Police (1,623)	Queensland Floods, Australia	Supervisor support (Caplan et al., 1980), work culture support[c]	Intrinsic Job Satisfaction (Warr et al., 1979), Job Demands and Job Control (Wall et al., 1995), Turnover Intentions (Brough & Frame, 2004), Utrecht Work Engagement Scale (Schaufeli et al., 2006), General Health Questionnaire-12 (Goldberg, 1972)
Chang et al. (2008)	Cross-sectional	3 months	Rescuers (193)	Ch-chi Earthquake, Taiwan, China	Ways of Coping Questionnaire (Folkman & Lazarus, 1988)	Chinese Health Questionnaire (Cheng & Williams, 1986), Impact of Event Scale (Horowitz et al., 1979)

K. Chang and Taormina (2011)	Cross-sectional	n.s.	Military rescuers (102)	Wenchuan Earthquake, China's mainland	Life Status Review Scale (Stamm et al., 1998)	Professional Quality of Life Scale (Stamm, 2005), Resilience Scale (Wagnild & Young, 1993)
Cone et al. (2015)	Longitudinal[a]	9 months	Police (2,204)	9/11 Attacks, USA	Absence of support[c]	PTSD Checklist (Weathers et al., 1993)
Dougall et al. (2001)	Longitudinal	12 months	Rescue and recovery workers (159)	Flight 427 Air Crash, USA	Social Support Questionnaire (Fleming et al., 1982)	Symptom Checklist-90-R Global Severity Index (Derogatis & Cleary, 1977)
Ehring et al. (2011)	Cross-sectional	4 months	Recovery workers (267)	Northern Pakistan Earthquake, Pakistan	Social Support Inventory (Timmerman et al., 2000)	Bradford Somatic Inventory (Mumford et al., 1991), Impact of Event Scale (Horowitz et al., 1979), Maslach Burnout Inventory (Maslach et al., 1986), Pakistan Anxiety and Depression Questionnaire (Mumford et al., 2005)
Feder et al. (2016)	Longitudinal	9–10 years	Police (4,487)	9/11 Attacks, USA	Medical Outcomes Study-Social Support Survey (Sherbourne & Stewart, 1991)	PTSD Checklist (Frank W. Weathers et al., 1993)
Huang et al. (2013)	Cross-sectional	n.s.	Rescuers (923)	Wenchuan Earthquake, China's mainland	Social support rating scale[c]	Clinician-Administered PTSD Scale (Blake et al., 1995)
Jenkins (1996)	Longitudinal	1 month	Emergency medical workers (36)	Mass shooting incident, USA	Absence of support, perceived support, support need, support utilisation, undifferentiated	Symptom Checklist-90-R (Derogatis & Cleary, 1977)

Jenkins (1997)	Longitudinal	2.5 months	Emergency dispatchers (68)	Hurricane Andrew, USA	Network size, support utilisation	Brief Symptom Inventory (Derogatis & Spencer, 1993), Impact of Event Scale (Horowitz et al., 1979)
Leppma et al. (2017)	Cross-sectional	n.s.	Police (113)	Hurricane Katrina, USA	Interpersonal Support Evaluation List (Cohen et al., 1985)	Alcohol use[c], Gratitude Questionnaire-6 (McCullough et al., 2002), Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996), Satisfaction with Life Scale (Diener et al., 1985)
Marmar et al. (2006)	Cross-sectional	n.s.	Police (717)	Loma Prieta Earthquake, USA	Sources of Support Scale (Perilla et al., 2002)	Mississippi Combat Scale-Civilian (Vreven et al., 1995)
Murphy et al. (2004)	Longitudinal	6 months	Firefighters (73)	9/11 Attacks, USA	Perceived support[c]	Impact of Event Scale (Horowitz et al., 1979)
Pietrzak et al. (2014)	Longitudinal	10 years	Police (4,035)	9/11 Attacks, USA	Network size[c]	PTSD Checklist (Frank W. Weathers et al., 1993)
Schenk et al. (2016)	Cross-sectional	3 months	Medical rescuer (337)	Wenchuan Earthquake, China's mainland	Social support items[c],	Impact of Event Scale-Revised Chinese version (Wu & Chan, 2003)
Schwarzer et al. (2014)	Longitudinal	4 years	Police (2,943)	9/11 Attacks, USA	Frequency of contact[c]	PTSD Checklist (Frank W. Weathers et al., 1993)
Schwarzer et al. (2016)	Longitudinal	9 years	Police (2,204)	9/11 Attacks, USA	Modified Social Support Scale (Ritvo et al., 1997)	PTSD Checklist (Frank W. Weathers et al., 1993)
Shepherd et al. (2017)	Cross-sectional	n.s.	First responders (138)	Canterbury Earthquake, New Zealand	Brief COPE (Carver, 1997)	Connor-Davidson Resilience Scale (Connor & Davidson, 2003), PTSD Checklist (Frank W. Weathers et al., 1993)

Tak et al. (2007)	Cross-sectional	1 month	Firefighters (525)	Hurricane Katrina, USA	Supervisor support dissatisfaction[c]	Center for Epidemiologic Studies Depression Scale (Radloff, 1977)
Tam et al. (2004)	Cross-sectional	2 months	Healthcare workers (652)	SARS outbreak, Hong Kong, China	Support inadequacy[c]	Chinese Health Questionnaire (Cheng & Williams, 1986)
Weiss et al. (1995)	Cross-sectional	n.s.	Emergency services personnel (367)	Loma Prieta Earthquake, USA	Scale from the National Vietnam Veterans Readjustment Study (Kulka et al., 1988)	Impact of Event Scale-Revised (Weiss, 2007), Mississippi Combat Scale-Combat (Keane et al., 1988)

Note. * Beginning and end of data collection, n.s. = not specified, [a]only cross-sectional data were used in the analysis, [b]average, [c]researcher-made scale

Measurement of post-disaster social support ranged from one week after the event to more than 10 years after. Only two studies had pre-disaster social support measures. Most of the studies had concurrent measures of social support and psychological outcome, with only six studies having a time lag ranging from three weeks to more than 10 years. Considering the wide variation in measurement time lags, separate meta-regression analyses were performed on disaster-social support measurement time lag and social support-outcome measurement time lag. No relationship was found between measurement time lag and effect size.

Almost half of the studies measured perceived social support, making it the most studied facet of social support in this review. This was followed by general/undifferentiated support with five studies and 10 effect sizes, and support utilisation with four studies and 10 effect sizes. Nineteen categories of psychological outcomes were observed. Of the 90 obtained effect sizes, only 14 were associations between social support and positive outcomes, such as resilience and posttraumatic growth. The other 76 effect sizes included normative negative outcomes, such as turnover intentions and perceptions of job demands; general psychological distress that may indicate psychopathology; or clinical outcomes such as posttraumatic stress symptoms (PTSS), depression, and anxiety. PTSS and psychological distress were the most studied outcomes. A summary of the number of effect sizes per social support facet and psychological outcome is found in Table 2.2.

Table 2.2. Number of effect sizes of associations of social support type and psychological outcomes in disaster responders

Psychological Outcomes	GenSS	RSS	PSS	Net	Use	Need	Abs	NegSS	Total No. of ES
Alcohol Use			1						1
Anxiety	1		4		1	1	1		8
Burnout	1		1						2
CS	1								1
Depression	1		4		1	1	1	1	9
Gratitude			1						1
Hostility	1		1		1	1	1		5
Job Control			3						3
Job Demands			3						3
Job Satisfaction			3						3
Life Satisfaction			1						1
OC Symptoms	1		1		1	1	1		5
Psych. Distress	1	1	10	1	2			1	16
PTG			1						1
PTSS	2	1	9	3	3		4		22
Resilience	1				1				2
Stress			1						1
Turnover Intentions			3						3
Work Engagement			3						3
Total No. of ES	10	2	50	4	10	4	8	2	90

Note. CS = compassion satisfaction, GenSS = general/undifferentiated social support, RSS = received social support, PSS = perceived social support, Net = social integration/embeddedness and network size, Use = support utilisation and coping, Need = social support need, Abs = absence of support, NegSS = negative social support, OC = obsessive-compulsive, PTG = posttraumatic growth, PTSS = posttraumatic stress symptoms, ES = effect size

To obtain the overall magnitude of social support influence on psychological outcomes, a meta-analysis on the absolute value of the 90 effect sizes was performed. This resulted in a weighted average effect size of 0.19 ($p < 0.001$) with a Fail-Safe N of 50,293. Effect sizes were found to be homogeneous. But it is not assumed that positive and negative psychological outcomes fall on the same continuum; hence, separate meta-analyses were conducted on each of the outcome categories (Table 2.3, Fig. 2.2). Compassion satisfaction, gratitude, job control, job satisfaction, life satisfaction, posttraumatic growth, resilience, work engagement, and reduction of posttraumatic stress symptoms were coded as positive outcomes, and all others coded as negative outcomes. Effect sizes were synthesised according to the five clusters of responders specified in the previous section. Social support

was found to have a positive effect on positive outcomes ($\bar{r} = 0.39, p < 0.001$) and a negative effect on negative psychological outcomes ($\bar{r} = -0.15, p < 0.005$) in the police. It was also found to have a negative effect on the negative outcomes ($\bar{r} = -0.27, p < 0.001$) in search and rescue workers and other responders ($\bar{r} = -0.19, p < 0.001$), with small to medium effect sizes. The 13 effect sizes associated with positive outcomes in police responders came from only three studies. Effect sizes associated with negative outcomes in rescue workers and other responders came from four studies each.

Table 2.3. Summary of effect sizes in positive and negative psychological outcomes

	Positive Outcomes						Negative Outcomes					
	n	K	$\bar{r}$ [95% CI]	p	χ^{2}[b]	Fail-Safe N	n	k	$\bar{r}$ [95% CI]	p	χ^{2}[b]	Fail-Safe N
Responder Type												
Emergency Medical Workers							3	23	-0.04 [-0.09 to 0.003]	0.068	6.1	-20
Firefighters							3	7	-0.09 [-0.19 to 0.01]	0.078	6.87	131
Police Responders	3	13	0.39 [0.31 to 0.47]	0.001	23.31	10,585	10	24	-0.15 [-0.25 to -0.05]	0.005	18.29	4,549
Rescue and Recovery Workers							4	14	-0.27 [-0.37 to -0.16]	0.001	15.13	786
Others[a]	1	2	0.19 [-0.18 to 0.5]	0.317	1	3	4	7	-0.19 [-0.25 to -0.13]	0.001	6.46	124
Social Support Facet												
General/Undifferentiated SS							4	8	-0.02 [-0.23 to 0.2]	0.864	2.78	53
Received SS							2	2	-0.24 [-0.3 to -0.17]	0.001	0.25	28
Perceived SS	2	12	0.41 [0.33 to 0.49]	0.001	18.97	10,586	11	38	-0.20 [-0.25 to -0.14]	0.001	41.37	10,702
Social Integration							3	4	0 [-0.06 to 0.06]	1	0	-4
Support Use and Coping	1	1	0	-	-	-	3	9	-0.08 [-0.22 to 0.07]	0.298	5.75	13
Absence of Support							4	8	-0.13 [-0.43 to 0.2]	0.442	2.41	226
Support Need							1	4	0 [-0.19 to 0.19]	1	0	-4
Negative SS							2	2	0.02 [-0.25 to 0.29]	0.89	1	-2

Note. $\bar{r}$ = weighted mean effect size, [a]Others = military, emergency dispatchers, combined sample of emergency services personnel; SS = social support, *n* = number of studies, *k* = number of effect sizes, χ^{2} = homogeneity of effect sizes; [b]*df* = *k* – 1, Fail-Safe N = Rosenthal Fail-Safe N

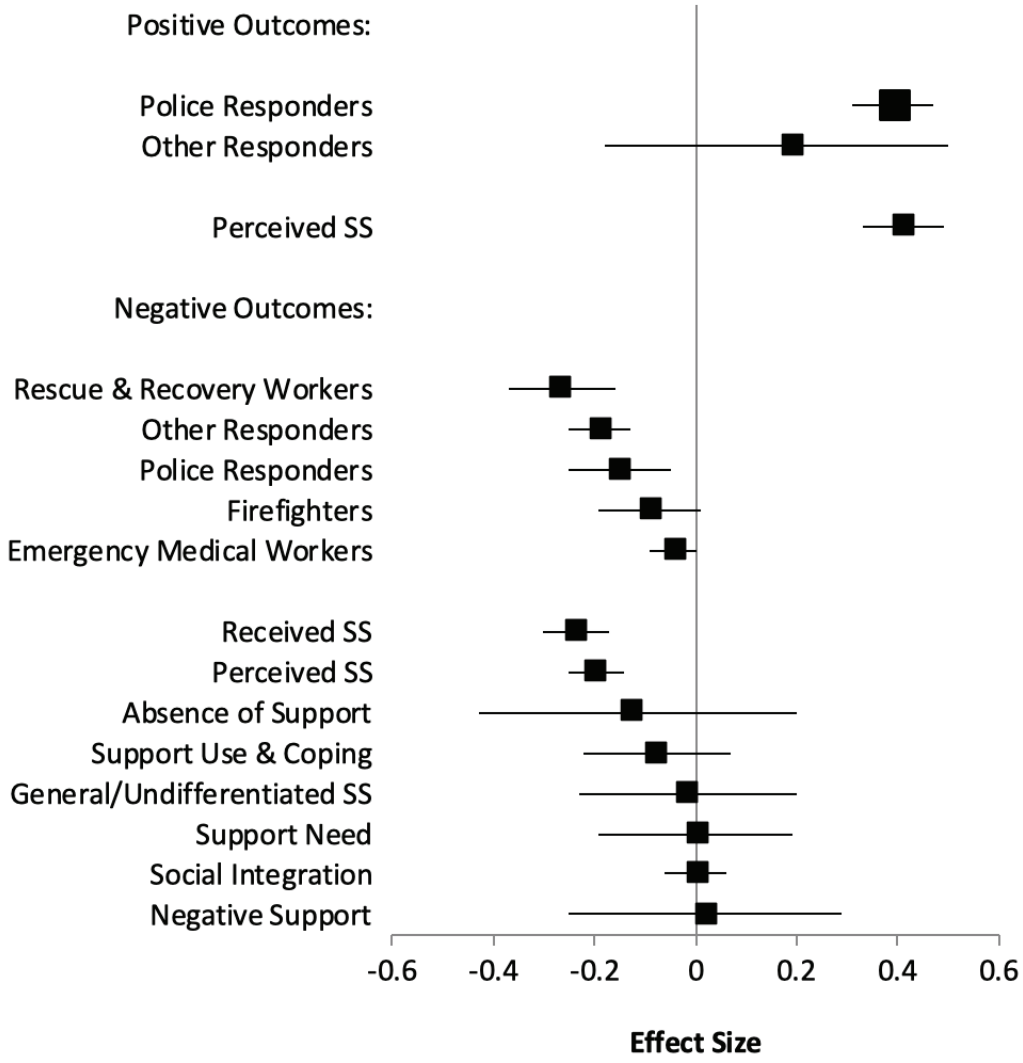

Fig. 2.2. Forest plot of social support effect sizes with 95% confidence intervals on positive and negative outcomes. Dot size indicates robustness of average effect size relative to other mean effect sizes, as indicated by the Rosenthal Fail-Safe N. This was constructed using Bailey's (2009) ForestPlot Tool.

Syntheses of effect sizes according to type of social support showed perceived support to be positively associated with positive psychological outcomes ($\bar{r} = 0.41, p < 0.001$) and negatively correlated with negative outcomes ($\bar{r} = -0.2, p < 0.001$), and received support to be negatively correlated with negative outcomes ($\bar{r} = -0.24, p < 0.001$). Higher levels of perceived social support were found to strongly co-occur with positive psychological change while higher levels of perceived social support and higher amounts of received social support

were found to be moderately associated with lower levels of negative psychological outcomes. Fail-safe N for received support indicates that the estimates are not robust. The 13 effect sizes involved in estimating the average effect size of perceived support on positive outcomes were obtained from just three studies.

Effect sizes on social support associations with specific psychological outcomes were pooled according to measurement time lag between the two variables (Table 2.4, Fig. 2.3). This analysis focussed on the effect sizes of presence of support on the outcomes. Negative support, support need, absence of support, and support utilisation were excluded as these facets of support belong to a different taxonomy; in addition, previous analyses have shown that these factors have no effect on psychological outcomes. All 19 outcomes had concurrent measures, while only 10 outcomes had a time difference between social support measurement and outcome measurement, allowing for an observation of effects of social support across time.

Table 2.4. Summary of effect sizes of concurrent and time-lagged associations of social support and psychological outcomes in disaster responders

	Concurrent Associations						Time-lagged Associations					
Psychological Outcomes	n	k	$\bar{r}$ [95% CI]	p	χ^{2}[a]	Fail-Safe N	n	k	$\bar{r}$ [95% CI]	p	χ^{2}[a]	Fail-Safe N
Alcohol Use	1	1	0	-	-	-						
Anxiety	3	3	-0.19 [-0.24 to -0.14]	0.001	0.736	53	1	2	0 [-0.27 to 0.27]	1	0.00	-2
Burnout	2	2	-0.21 [-0.31 to -0.11]	0.001	0.1	10						
Compassion Satisfaction	1	1	0	-	-	-						
Depression	3	3	-0.15 [-0.24 to -0.06]	0.002	2.37	29	1	2	0 [-0.27 to 0.27]	1	0.00	-2
Gratitude	1	1	0.69	-	-	-						
Hostility							1	2	0 [-0.27 to 0.27]	1	0.00	-2
Job Control	1	2	0.27 [0.22 to 0.33]	0.001	1	185	1	1	0.22			
Job Demands	1	2	0 [-0.27 to 0.27]	1	0.00	-2	1	1	0			
Job Satisfaction	1	2	0.57 [0.54 to 0.61]	0.001	1	1,008	1	1	0.44			
Life Satisfaction	1	1	0.58									
OC Symptoms	1	2	0 [-0.27 to 0.27]	1	0.00	-2						
Psychological Distress	7	11	-0.32 [-0.41 to -0.23]	0.001	19.75	1,323	2	2	-0.2 [-0.24 to -0.15]	0.001	0.003	37
PTG	1	1	0									
PTSS	9	10	-0.05 [-0.27 to 0.17]	0.664	2.46	22	3	5	-0.05 [-0.14 to 0.04]	0.261	5.1	12
Resilience	1	1	0.36									
Stress	1	1	-0.22									
Turnover Intentions	1	2	-0.36 [-0.4 to -0.33]	0.001	1	346	1	1	-0.3			
Work Engagement	1	2	0.42 [0.39 to 0.45]	0.001	0.81	476	1	1	0.35			

Note. $\bar{r}$ = weighted mean effect size, OC = obsessive-compulsive symptoms, PTG = posttraumatic growth, PTSS = posttraumatic stress symptoms, *n* = number of studies, *k* = number of effect sizes, χ^{2} = homogeneity of effect sizes; [a]*df* = *k* – 1, Fail-Safe N = Rosenthal Fail-Safe N

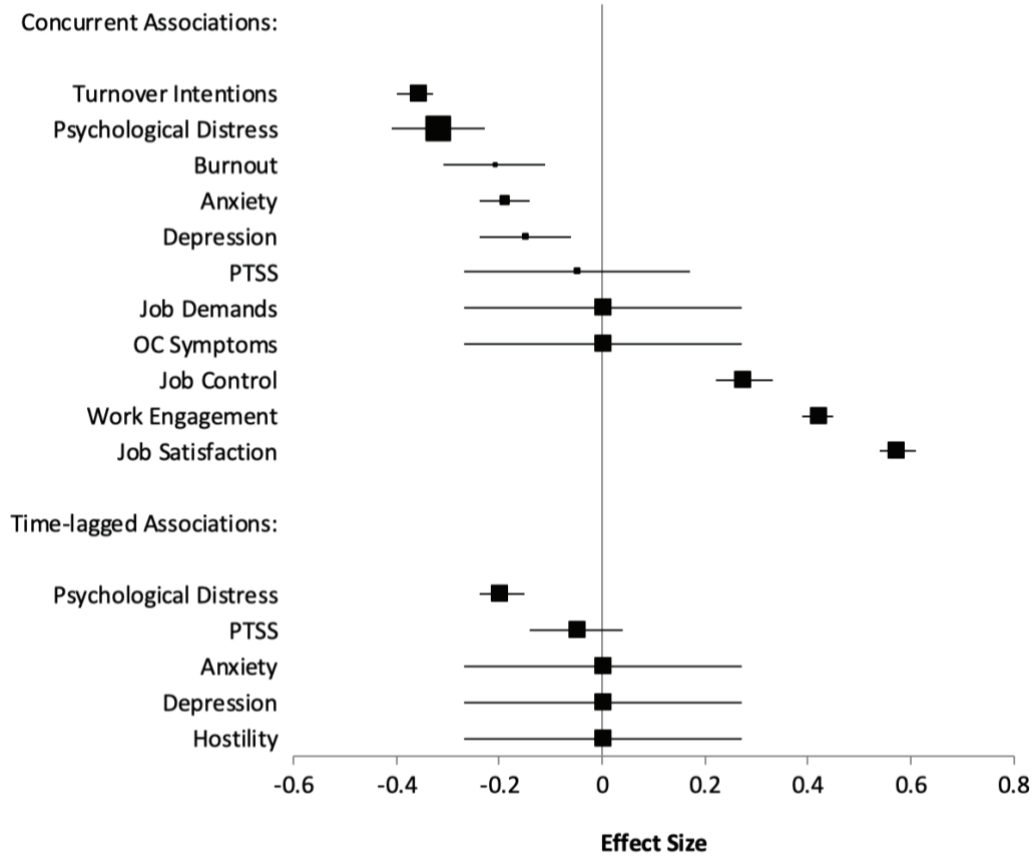

Fig. 2.3. Forest plot of social support effect sizes with 95% confidence intervals on concurrent and time-lagged associations. Dot size indicates robustness of average effect size relative to other mean effect sizes, as indicated by the Rosenthal Fail-Safe N. This was constructed using Bailey's (2009) ForestPlot Tool.

Consistent with the previous analyses, concurrent associations showed social support to have the largest effect sizes on positive outcomes: job satisfaction ($\bar{r} = 0.57, p < 0.001$) and work engagement ($\bar{r} = 0.42, p < 0.001$). Work-related outcomes also had larger effect sizes than the other psychological outcomes. Anxiety ($\bar{r} = -0.19, p < 0.001$) and psychological distress ($\bar{r} = -0.32, p < 0.001$) were the only clinical outcomes associated with social support. Furthermore, psychological distress was the only outcome for which a time-lagged effect of social support was observed ($\bar{r} = -0.20, p < 0.001$).

Discussion

Responding to disasters takes a psychological toll on the responder, and common knowledge suggests the benefits of social support in these circumstances. This review shows that although having social support is helpful, the benefits of social support are circumscribed. This is, first and foremost, shown by effect sizes that are small to medium, leaving a large amount of variance in psychological outcomes that cannot be explained by social support. In other words, although social support positively influences positive outcomes and negatively influences negative outcomes, its degree of influence is not that strong. In addition, the effects of social support on psychological outcomes were observed in some conditions but not in others, which suggests that the psychological benefits of social support do not encompass all outcomes.

Studies included in the review utilized a wide variety of instruments to measure social support. One explanation is that researchers may have differences in the understanding of what constitutes social support. Recognising distinctions between the different facets of support is imperative, as each facet has a unique contribution to psychological outcomes. The influence of the different facets of social support is also amplified by disasters. These types of critical events challenge resources, including social resources such as social support. The Social Support Deterioration Deterrence (SSDD) model suggests that in the aftermath of disasters, people have unequal and inequitable access to and utilisation of support, which may, in turn, influence people's perception of support (Kaniasty & Norris, 2009). Perceptions of support directly influence emotional distress but receipt of actual support may only have indirect effects. Also, people who receive support may not necessarily feel supported, as explained by the Stress-Support Matching Hypothesis (Cutrona & Russell, 1990), which posits that support is only effective if it answers the need. Furthermore, the Social Support Effectiveness model

(Rini & Dunkel Schetter, 2010) suggests that whether social support is helpful or harmful depends on the degree to which the particular supportive behaviours address the need in terms of both quality and quantity. These models of explaining social support dynamics, which are anchored on empirical observations, highlight the need to study social support not as a global construct, but as a multidimensional one.

Having stated this, it is worth noting that the majority of the studies focussed on perceived social support. Congruent with the SSDD model, perceived support—having direct effects on psychological outcomes—has the largest effect size among the facets of support. Perceived support comes in the form of appraisal of support quality and availability, and it has long been shown that appraisal of risk and protective factors such as social support in the context of disasters is closely associated with post-disaster outcomes (Bonanno et al., 2010). Such forms of appraisal are also found to be clinically useful in treating post-disaster psychological distress, as in the case of cognitive behavioural therapies (Hamblen, Norris, Symon, & Bow, 2017). However, it is also important to study more concrete facets of support—received support and social embeddedness, which can be externally controlled as a form of intervention.

Other than support facet, the effect size of social support on psychological outcomes also varied across type of responder (the recipient of support). The observed small to medium effect sizes in police responders has been corroborated by social support studies on police officers outside the disaster context as well (de Terte, Stephens, & Huddleston, 2014; Stephens, Long, & Miller, 1997). The absence of observed effect in other clusters of responders, however, does not necessarily mean social support is ineffective in these groups. These results must be interpreted in the context of small numbers of studies, differences in support measures, and other moderating variables that are not accounted for in this review.

In spite of the small number of effect sizes involved, it is important to note that social support affects work-related psychological outcomes at medium to large effect sizes. Work-related outcomes are normative, as opposed to clinical outcomes. They are also less intense than clinical outcomes, which could require professional help, such as psychotherapy. What these results suggest is that the effectiveness of social support decreases as the psychological outcome becomes more clinical in nature. It is clear that social support has the potential to alleviate symptoms, but given the present evidence, it should not replace the more specialized forms of treatment of clinical syndromes in disaster responders. This demonstrates one of the limitations of social support effectiveness.

Differences in the effect sizes of social support in psychological outcomes were also observed between concurrent and time-lagged measurements, where effect sizes in time-lagged measurements were lower than those in concurrent measurements, which runs contrary to the findings of Prati and Pietrantoni (2010). This was observed both at the individual study level (for studies with time-lagged measurements) and at the meta-analytic level. To test this observation further, the absolute values of the 147 reported effect sizes (before they were combined at the individual study level) were plotted against the lag between the measurement of social support and of the psychological outcomes (Fig. 2.4), where a pattern of effect sizes approaching zero is observed as the lag increases. Admittedly, there are very few studies included with longer support / outcome measurement time lags, which possibly accounts for the absence of correlation between the two variables.

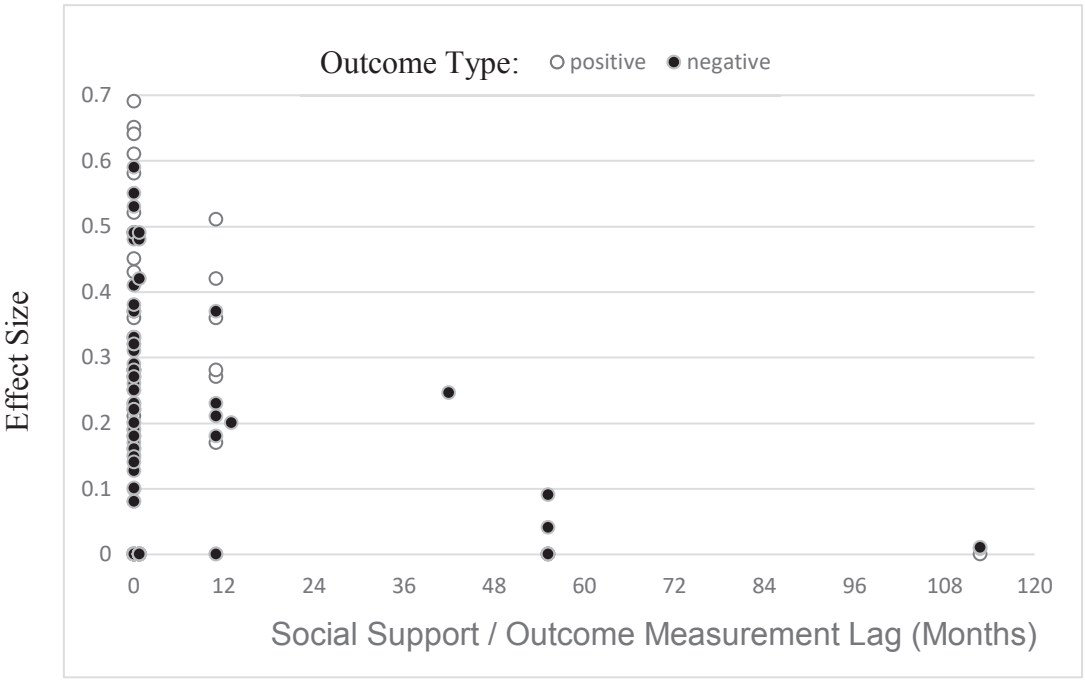

Fig. 2.4. Absolute value of reported effect sizes (k = 147) across social support-psychological outcome measurement time lag (months)

In the same fashion, the absolute values of the 88 reported effect sizes on concurrent measurements were plotted against the time of measurement relative to the disaster (Fig. 2.5) in order to check for patterns of effect size changes in concurrent measurements. This generated a more dispersed scatterplot, but further inspection revealed a pattern of effect size reduction from 10 months prior to disaster until 28.8 months after, with a correlation approaching significance ($k = 71, r = -0.23, p = 0.054$). Furthermore, effect sizes 80 months post-disaster seem to follow the pre-disaster effect size dispersion pattern. With a small number of effect sizes involved and with the innate limitations of meta-analytic reviews, these observations are far from conclusive. But they support the idea of post-disaster social support deterioration. In addition, social support deterioration process may possibly naturally cease to continue sometime around 28.8 months after the disaster. These observations are worth looking into in future

studies, as it is crucial to know patterns of decline and rebound of social support effectiveness in order to know when to intervene.

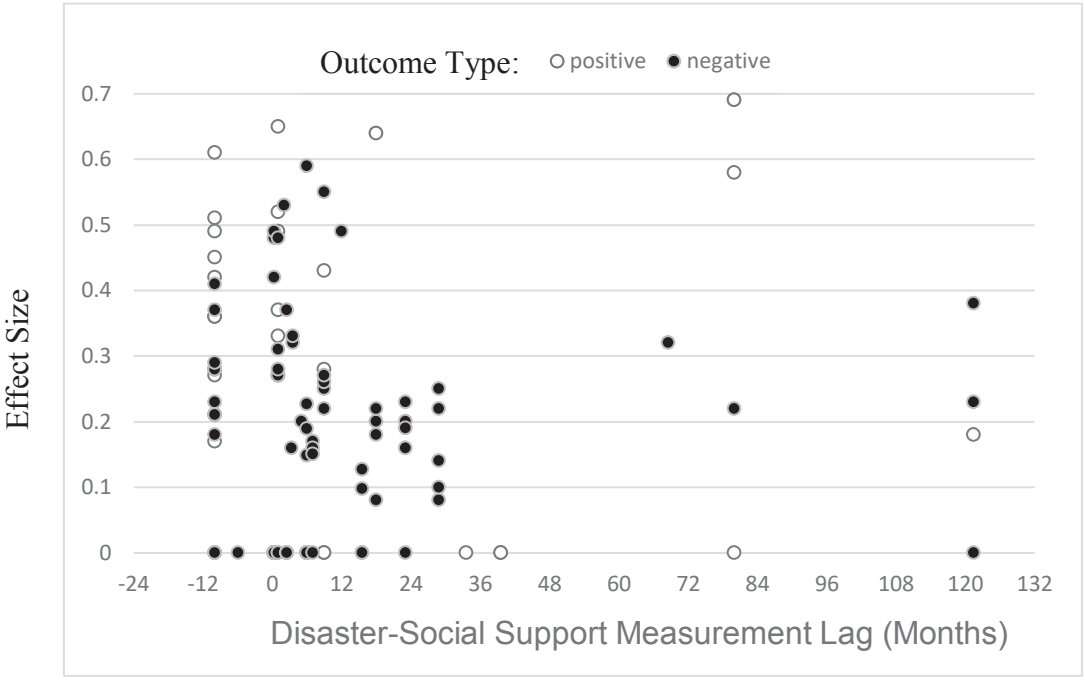

Fig. 2.5. Absolute value of reported effect sizes (k = 88) of concurrent measurements across disaster-social support measurement time lag (months)

Individual studies have long observed the long-term effects of social support on psychological outcomes (Holahan & Moos, 1981; Kaniasty & Norris, 2008), but the changes in the magnitude of the effect of social support over time has not yet been thoroughly studied. This brings to light another possible property of social support process: its effectiveness and relevance may decrease over time. This is especially important in the context of disasters, where social support is observed to deteriorate over time as revealed by the SSDD model employed by Kaniasty and Norris (2009). Along with the deterioration of support is the possible deterioration of its effect. This is not very surprising but should be pointed out, nevertheless. Social support has long-

term effects on psychological outcomes, and the strength of these effects may depend on when the support is provided.

The results further the debate on the role that social support plays in effecting psychological change. Traditionally, social support is framed to have main effects or stress-buffering effects on psychological outcomes (Cohen et al., 2000). The main effects model suggests that social support universally contributes to positive outcomes (regardless of presence of stressors). The stress-buffering model, on the other hand, suggests that social support in itself has little effect on mental health in times of calm whereas it substantially reduces the negative impact of stressful experiences such as disasters. This effect was observed in this review: presence of support was linked to reduction of negative outcomes, and absence of support had no significant contribution to psychological outcomes.

On the other hand, social support being positively associated with favourable psychological outcomes after disaster exposure does not fit the stress-buffering frame. However, it fits a positive outcome-enhancement frame. Both buffering and enhancement effects are statistical moderation patterns (Jose, 2013a), and with the assumption that the effect sizes observed are conditional to the disaster exposure, social support may enhance positive outcomes and buffer the negative effects of disaster exposure that results in lower levels of negative outcomes. In the absence of pre-disaster measures, this is speculation, but is worth exploring further.

It is interesting to note that our results differ from those of Brewin et al. (2000) and Ozer et al. (2003) in terms of the association of social support with PTSD. These authors reported weighted effect sizes of 0.43 and -0.28, respectively compared to finding no effect in this meta-analysis. However, Brewin et al.'s work synthesised effect sizes of lack of support in the context of general traumatic experiences and on

trauma survivor populations. On the other hand, the current study focusses its analysis on the presence of support on a group of professionals impacted by a specific form of traumatic exposure with unique organisational cultures that may influence social support provision and utilisation. For example, support seeking in emergency response organisations may carry with it a stigma of weakness or helplessness, which may hamper support seeking behaviour and consequently, support received. Similar to the current analysis, Ozer et al.'s work analysed the effect sizes of the presence of support, but it differs from the current study in two ways. First, it is focussed on perceived social support, whereas the current study examined perceived support along with received support, undifferentiated support, and social embeddedness. Second, Ozer et al.'s meta-analysis synthesised the effect sizes of two types of samples: the general population and combat-exposed adults. Just as in Brewin et al.'s meta-analysis, these samples were also exposed to broad types of trauma. These key differences in the inclusion of facet of support, type of sample, and type of exposure may explain why the previous meta-analyses found associations between social support and PTSD, in contrast to the absence of such association found in the present analysis.

This review comes with several limitations. First, there are overlaps in some effect sizes in terms of the sample and measures involved. Second, there is also a wide variation of the number of studies and consequently, effect sizes, involved in the analyses. In addition, some syntheses involved effect sizes as few as two, which impact the accuracy of the estimates. Finally, the studies involved in this analysis heavily focussed on the 9/11 attacks; hence, generalization of results to disaster responders in general should be done with caution. The inclusion of the number of studies, the number of effect sizes, and the Rosenthal Fail-Safe N should indicate the robustness of

the analyses and would contextualize the estimates. Because of the nature of the analyses, qualitative studies and a number of quantitative studies were excluded.

Notwithstanding these limitations, this review shows the topography of the research area, which may help inform the territories that need to be charted. In contrast to Prati and Pietrantoni's (2010) work, the present review focusses on responders in the context of disasters. This is an important distinction to make. Disasters are critical events that challenge the coping capacity of communities, which consequently increase reliance on external sources of support. This effect of overwhelming collective internal resources is a distinct characteristic of a disaster, distinguishing it from other forms of critical incidents. This review, therefore, sets itself apart from previous work, such that it examines the strength of association between social support—a form of external resource—and psychological outcomes in disaster responders—people who both provide and receive support—in situations where (social) support is highly needed.

Conclusion

This study examined the effects of social support indicators on various psychological outcomes in disaster first responders. Social support was observed to have varying degrees of association with these outcomes, which may be contingent on the facet of support and other factors associated with the type of responder and other temporal factors. Along with the evidence for usefulness of support, the limitations of this resource were also presented. With these observed conditions that influence the helpfulness of social support, future studies should look into the facets of support that can be used for intervention, and the conditions that may optimize the effectiveness of these supportive behaviours and interactions.

In most cases, social support is spontaneous and naturally occurring. As such, it presents itself as a sustainable form of psychosocial intervention for buffering the negative consequences of disasters in responder groups. As this article illustrates, social support may even enhance positive outcomes in the aftermath of disaster exposure. However, good intentions do not always lead to desirable results, and providing support does not always result in positive psychological consequences. Social support may also benefit some types of disaster responders but not others. These differences may be influenced by several factors, such as differences in organisational structure, organisational culture, and the economic benefits of the profession. Future research should look into how these different variables moderate the effectiveness of supportive interactions.

Studies should also pay careful attention to the different components of social support and explore how these components influence outcomes in different types of responders. For example, researchers should look into the effectiveness of the different forms and sources of social support for police officers. These efforts could then inform the development of social support-based interventions, such as peer support programs or programs that focus on their work partners. It is not only important to know who can support disaster responders, but what form of social support works, and when best to provide these supportive behaviours. Social support is a potent element of post-disaster psychological recovery, but it is important to understand its nuances to optimize its potency.

Chapter Three: Social support and posttraumatic stress symptoms: A meta-analysis of emergency responders

Abstract

Social support is seen as a protective factor against the consequences of traumatic events. This meta-analysis summarizes the effect sizes of 60 social support studies associated with posttraumatic stress symptoms in emergency responders. Using the Hedges-Vevea Random-Effects model, correlation coefficients were analysed according to type of social support, source of social support, type of responder, geographic location, and PTSS dimension. Results showed that undifferentiated social support ($\bar{r} = -.15, p = .013$) and perceived social support ($\bar{r} = -.16, p < .001$) were associated with lower PTSS. Support from peers ($\bar{r} = -.19, p = .001$) and supervisors ($\bar{r} = -.17, p < .001$) were found to have the largest effect sizes among the different social support sources. Military responders were observed to benefit from social support the most ($\bar{r} = -.25, p < .001$). Social support is also observed to have stronger associations with PTSS in some countries/regions but not in others. This review highlights the differences of effects in the different components of social support and provides recommendations for research and intervention.

Introduction

In some Asian cultures, the bamboo is a symbol of resilience. Its ability to bounce back by bending and swaying through typhoons has been likened to a person's capacity to withstand adversity. Yet, as resilient as it is, one rarely sees a bamboo alone—they always grow in clumps, and sway through storms in a collective, as a group. In the same manner, people also withstand life's turbulences collectively; conventional

wisdom suggests there is safety in numbers. Support from others has always been seen as crucial in surviving difficult moments, such as being exposed to traumatic events, which pose threat of death or injury, and may elicit fear or helplessness (American Psychiatric Association, 1994). The importance of having support from other people is especially highlighted in emergencies and disasters—traumatic events that are usually collectively experienced (McFarlane & Norris, 2006).

Exposure to emergencies and disasters is linked to various psychological outcomes. Posttraumatic stress symptoms (PTSS) are some of the more commonly studied psychological reactions in the aftermath of such exposure (see DiMauro, Carter, Folk, & Kashdan, 2014; Morina, Wicherts, Lobbrecht, & Priebe, 2014; Norris et al., 2002). The psychological effects of exposure to disasters and emergencies are widely studied in survivor populations (see Norris et al., 2002). Although it is generally recognised that responder groups, such as emergency responders, may be at risk of developing PTSS following such kinds of exposure (Haugen, Evces, & Weiss, 2012), research on responder samples, until the last decade, are significantly outnumbered, with approximately six times more studies on survivor groups than responder groups (see Norris & Elrod, 2006). In the same review, and in others (e.g., Brewin, Andrews, & Valentine, 2000; Hobfoll et al., 2007), social support was found to be a protective factor that shields individuals—survivors and responders alike—from negative psychological outcomes such as PTSS. This article focusses on the elements of social support associated with posttraumatic stress symptoms.

Social support is defined as behaviours and social interactions that provide actual assistance and embed people in a web of caring and loving social relationships (Hobfoll & Stokes, 1988). This multidimensional construct is characterized as spontaneous and informal, which differentiates it from other forms of supportive behaviours. Kaniasty

and Norris (2009) have presented a thorough discussion of its different facets: received support refers to the actual receipt of social support; perceived support refers to the evaluation of the quality and availability of support; and social embeddedness is the sense of being part of a caring group of people who are ready to provide support when needed. Empirical studies have strongly documented that various manifestations of social support serve as a protective factor against psychological distress brought about by exposure to trauma (see Goldmann & Galea, 2014), including the symptoms of PTSD (see Brewin et al., 2000; Ozer, Best, Lipsey, & Weiss, 2003). Interestingly, there appears to be a lack of consensus regarding the benefits of social support for emergency responders (e.g., Brooks, Dunn, Amlôt, Greenberg, & Rubin, 2016; Carpenter et al., 2015).

Emergency responders are professionals tasked to protect and preserve life, property, and the environment (Prati & Pietrantoni, 2010b) in the aftermath of emergencies and disasters. These events, such as earthquakes, typhoons, floods, epidemics, transport accidents, and terror attacks and other episodes of mass violence, may cause psychological trauma. Unlike most people, emergency responders are systematically exposed to these types of traumatic events as part of their occupations. In terms of social support, they are also in a unique position of being support providers and support recipients (Guilaran et al., 2018) during critical events. These unique characteristics set emergency responders apart from other trauma-exposed groups, and it is of interest to explore how the different elements of social support relate to posttraumatic reactions in these types of professionals.

The purpose of this meta-analysis is to summarize the association of social support with posttraumatic stress symptoms in emergency responders. Specifically, the study aimed to synthesise the effect sizes of the different facets of social support on total PTSS and

on the different symptom clusters. This meta-analysis also aimed to explore certain moderators that may influence the strength of social support-PTSS association.

Method

Literature search, and inclusion and exclusion criteria

Articles were identified through keyword searches completed in Scopus, PubMed, and Web of Science. The following social support keywords were used in the search: "social support," "received support," "perceived support," "social embeddedness," "social integration," "emotional support," "informational support," "practical support," "instrumental support," "social network," "assistance," "tangible support," and "negative support." The following PTSS keywords were used: "PTSD," "post-traumatic stress disorder," "posttraumatic stress disorder," "post-traumatic stress symptoms," "posttraumatic stress symptoms," "post-traumatic stress disorder symptoms," "posttraumatic stress disorder symptoms," "PTSD symptoms," and "PTSS." The following emergency responder keywords were used: "first responder," "emergency responder," "emergency worker," "police," "military," "firefighter," "fire fighter," "fire service*," "ambulance," "red cross," "red crescent," "disaster responder," and "emergency med*." The article search only included empirical studies and studies in the English language. Other types of manuscripts, such as reviews, conceptual and theoretical papers, editorials, and unpublished work were not included.

Figure 3.1 shows the process flow, from article identification to article inclusion (Moher et al., 2009). After removing the duplicates, 268 articles were initially identified from the three databases, abstracts of which were examined for inclusion. Exclusion of studies on war veterans retained 157 articles. This was further trimmed down to 154 manuscripts after studies on student populations were excluded. Studies on combat-

related PTSS were removed, leaving 130 manuscripts for screening. The references of these manuscripts were then checked, which resulted in 9 manuscripts related to the topic. The citations of the 130 manuscripts were also checked, through Google Scholar, which resulted in 17 more articles. Articles-at-hand from the researchers were also added. These articles were those that cover the variables of interest but did not appear in the keyword search. These articles were then examined further, removing the purely qualitative studies, which were not the focus of this paper. This resulted in 117 manuscripts.

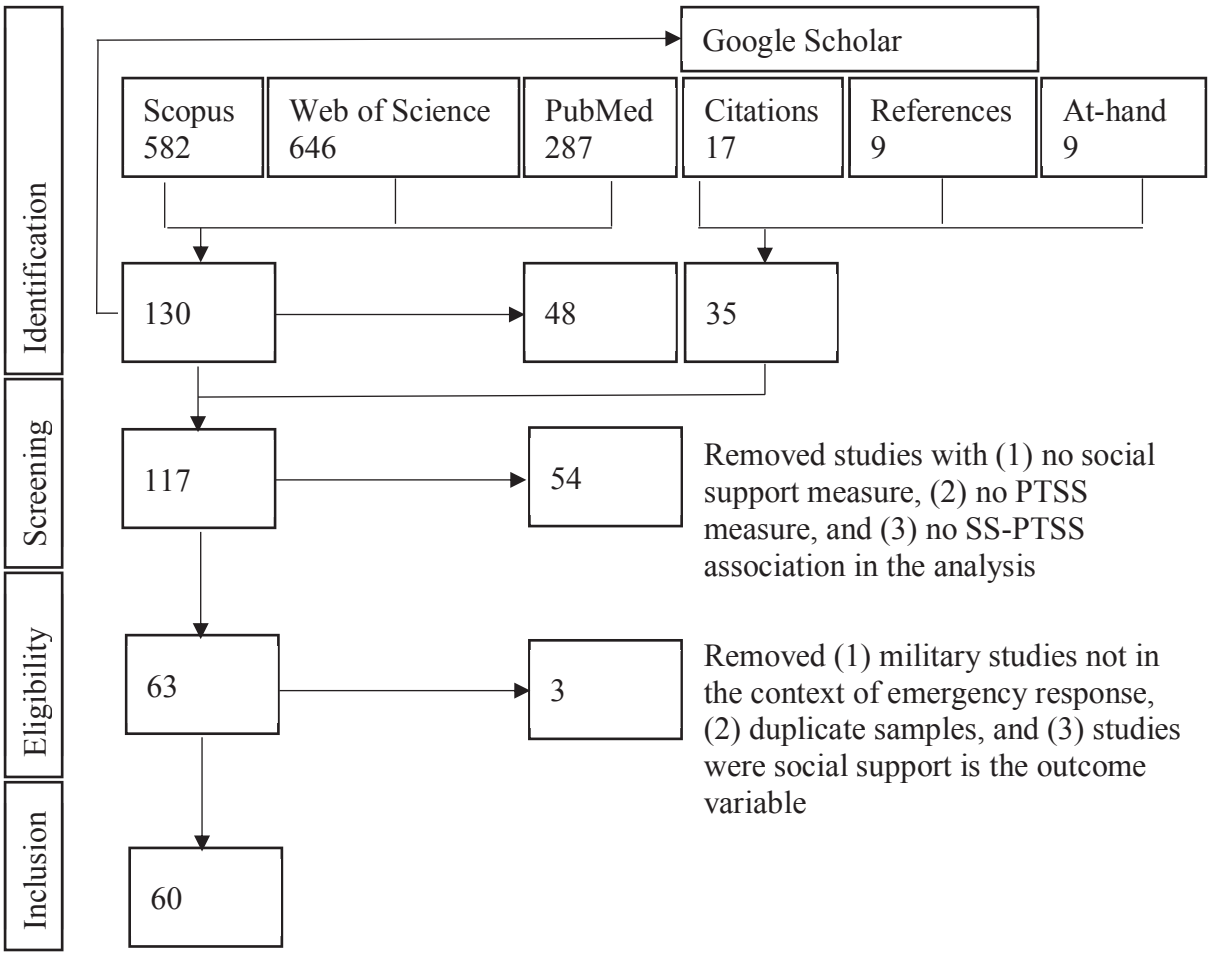

Fig. 3.1. Process of article identification, screening, and inclusion (Moher et al., 2009). Articles were identified through keyword search in various databases. Studies on veterans, students, and survivor samples; and studies on combat-related and combat-specific PTSS were removed in the identification process. A set of inclusion and exclusion criteria were applied in the screening and eligibility phases.

The methods of these manuscripts were then screened, removing 54 studies that had no social support measure, no PTSS measure, or no social support-PTSS association in the analysis. The full-text of the remaining 63 were then scrutinized. This resulted in 3 more manuscripts being excluded because (1) they were military studies outside the context of emergency response, (2) they were studies using the same sample, and (3) social support in these studies

were outcomes rather than predictors. This finally resulted in 60 manuscripts being included in the analyses.

Coding of studies

The general characteristics of the articles were coded as follows: (a) author, (b) year of publication, (c) type of responder, (d) sample size, (e) country, (f) social support measure, and (g) PTSS measure. Social support was then coded according to facet and source. Social support facet was coded as (a) undifferentiated support, (b) social embeddedness, (c) perceived support, (d) received support, (e) negative support, or (f) absence of support. Single-item scales, and scales measuring the number of contacts were coded as "undifferentiated support." Support dissatisfaction, relational strains, and unsupportive interactions were coded as "negative support." Lack of support was coded as "absence of support." Four categories of support sources were coded: (1) nonwork sources, which include the partner, family, friends, and neighbours; (2) peers; (3) supervisors; and (4) workplace (general), which includes employers and the union; and (5) undifferentiated sources. PTSS was coded as (a) total PTSS, (b) avoidance, (c) hyperarousal, or (d) intrusion and re-experiencing. Location of the studies was also coded. African studies were combined. Studies conducted in Europe, East Asia, and South and West Asia were also grouped accordingly. Studies in Australia and New Zealand were placed in one category. Because of the large number of studies involved, USA was coded separately. Canada and Brazil were coded separately because they did not have any geographical neighbours in the study pool. Finally, the type of emergency responders was coded as follows: (a) composite, which include samples that were combined/not disaggregated; (b) fire service; (c) medical; (d) military; (e) police; and (f) search, rescue, recovery, and relief.

Calculation of effect sizes

The Pearson product moment correlation was used as the base effect size for the analysis. The choice of *r* was both for practical and theoretical reasons. Most of the studies included in the review had effect sizes presented in r, and effect sizes presented as odds ratio were easily convertible to r. The *r* statistic was chosen over r^2 as it allows for more flexibility in interpretation, and is easier to understand (Field & Gillett, 2010), while minimising the chances of drawing erroneous conclusions (for a thorough discussion on this topic, see Schmidt & Hunter, 2015). Effect sizes presented in other forms were converted to r. Effect sizes with p-values greater than .05 were coded as 0.

A unique combination of sample, social support facet, social support source, and PTSS measure constituted one effect size. In cases where studies have multiple effect sizes, within-study effect sizes were pooled using the Fixed Effects Model (Hedges & Vevea, 1998), as this procedure of combining effect sizes constrains the generalizability of results only to the sample included. Because of the difficulty of incorporating longitudinal data in the analysis, only cross-sectional associations in longitudinal studies were included in the analyses. In cases of odds ratios, only effect sizes of extreme values comparisons were included (e.g., low vs high support, no PTSD vs chronic PTSD). In cases of studies investigating PTSD with comorbid disorders, only the effect sizes of PTSD without comorbidity were included.

The Hedges-Vevea (1998) Random-Effects model was used to synthesise between-study effect sizes, as it is argued to have better control over Type I Error compared to the Hunter-Schmidt (2000) model, especially when small numbers of effect sizes are involved (Field, 2003). Synthesis of effect sizes were done using SPSS Version 25, using the syntax provided by Field and Gillett (2010). The Rosenthal Fail-Safe N was included to check the robustness of the synthesised effect sizes, to allow the readers to contextualize these effect sizes, and to

address possible publication bias. Homogeneity of effect sizes were checked using the χ^2 test of homogeneity with $df = k - 1$ (Field & Gillett, 2010); all synthesised effect sizes were found to be homogeneous. The sizes of synthesised effects were interpreted using Hemphill's (2003) guidelines on interpreting the magnitudes of correlation coefficients.

Results

Sixty studies with 157 effect sizes were included in the meta-analysis. Publication years ranged from 1995 to 2018, with 70% of the articles published in 2010 onwards. A significant number of studies were on the police ($n = 22$) and the fire service ($n = 14$). A large number of studies were conducted in the US ($n = 27$). The study included a total sample size of 83,868.

A stem-leaf plot was constructed to show the distribution of effect sizes of the association between social support and PTSS and its symptom clusters (Table 3.1). Strikingly, the majority of effect sizes were under the .00 stem, followed by those in the -.20 stem, indicating a bimodal distribution. This suggested heterogeneity of effects.

Table 3.1. Stem-leaf plot of the social support effect sizes on PTSS (k=157)

stem	leaf
-0.50	4, 1
-0.40	6, 5, 5, 5
-0.30	9, 9, 9, 9, 8, 7, 6, 5, 5, 5, 5, 3, 2, 2, 2, 2, 2, 1, 0, 0
-0.20	9, 8, 8, 8, 8, 8, 7, 7, 6, 6, 5, 5, 5, 4, 4, 4, 3, 3, 3, 3, 3, 2, 2, 2, 1, 1, 1, 0, 0, 0, 0
-.010	9, 9, 9, 9, 9, 9, 9, 8, 8, 8, 7, 7, 7, 4, 3, 3, 3
-0.00	7, 7, 6, 6, 5, 4, 2
0.00	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 8
0.10	0, 4
0.20	3, 3, 3
0.30	6
0.40	7, 9
0.50	8

Analysis of social support facet effect sizes on total PTSS

Table 3.2 shows the synthesised social support effect sizes on total PTSS. A forest plot (Fig. 3.2) showing the means and confidence intervals (95%) of the synthesised effect sizes is also presented. The forest plot was constructed using Bailey's (2009) ForestPlot tool, which also shows how robust the synthesised effect sizes are. Larger dots signify relatively more robust syntheses.

Table 3.2. Summary of social support facet effect sizes on total PTSS

	n	k	$\bar{r}$ [95% CI]	p	χ^2	Fail-Safe N
SS Facet						
Undifferentiated SS	16	31	-.15 [-.26 to -.03]	.013	16.86	2067
Embeddedness	2	3	-.12 [-.25 to .01]	.068	2.07	120
Perceived SS	35	62	-.16 [-.20 to -.13]	<.001	77.72	12994
Received SS	5	6	-.08 [-.20 to .04]	.189	4.60	63
Negative SS	8	8	.18 [-.01 to .35]	.060	5.21	246
Absence of SS	1	1	.08			
Responder Type[a]						
Composite	7	10	-.09 [-.17 to -.002]	.045	7.53	108
Fire Service	13	28	-.15 [-.21 to -.08]	<.001	18.87	1132
Medical	5	8	-.19 [-.29 to -.08]	.001	5.66	362
Military	2	8	-.25 [-.32 to -.17]	<.001	10.09	396
Police	22	35	-.15 [-.20 to -.09]	<.001	39.37	4206
Search, Rescue, Recovery, Relief	9	13	-.11 [-.37 to .17]	.447	5.16	892
Source of Support[a]						
Nonwork Sources	18	29	-.14 [-.18 to -.10]	<.001	38.29	1683
Peers	11	12	-.19 [-.30 to -.08]	.001	13.37	425
Supervisor	10	10	-.17 [-.23 to -.11]	<.001	11.05	338
Workplace (General)	9	14	-.13 [-.20 to -.07]	<.001	12.24	775
Undifferentiated Sources	36	37	-.14 [-.24 to -.05]	<.001	24.76	4922
Location[a]						
Africa	2	2	-.37 [-.49 to -.24]	<.001	1.00	68
Australia and New Zealand	8	24	-.19 [-.24 to -.13]	<.001	24.94	1757
Brazil	1	1	-.09			
Canada	3	6	-.06 [-.18 to .06]	.343	5.95	21
East Asia	6	10	-.02 [-.17 to .14]	.807	10.15	-5
Europe	8	19	-.19 [-.26 to -.12]	<.001	21.36	715
South and West Asia	4	4	-.08 [-.19 to .04]	.213	2.38	0
USA	27	36	-.15 [-.23 to -.07]	<.001	23.01	8315

Note: n=number of studies; k=number of effect sizes, $\bar{r}$ =weighted average effect size; χ^2 df =k-1; SS=social support; [a] analyses excluded negative support and absence of support

Of the different facets of social support, only perceived social support and undifferentiated social support were associated with total PTSS at $p < .05$. Perceived social support was the most studied facet of social support in relation to total PTSS ($n = 35, k = 62$). It also has the most robust synthesis. Having stated this, perceived support was associated with total

PTSS to a small extent ($\bar{r} = -.16, p < .001$), suggesting an association of low total PTSS scores along with high level of perceived support. Undifferentiated social support was also negatively associated with total PTSS with a small effect size ($\bar{r} = -.15, p = .013$), an effect which is similar with that of perceived social support, but with a wider spread in terms of confidence intervals.

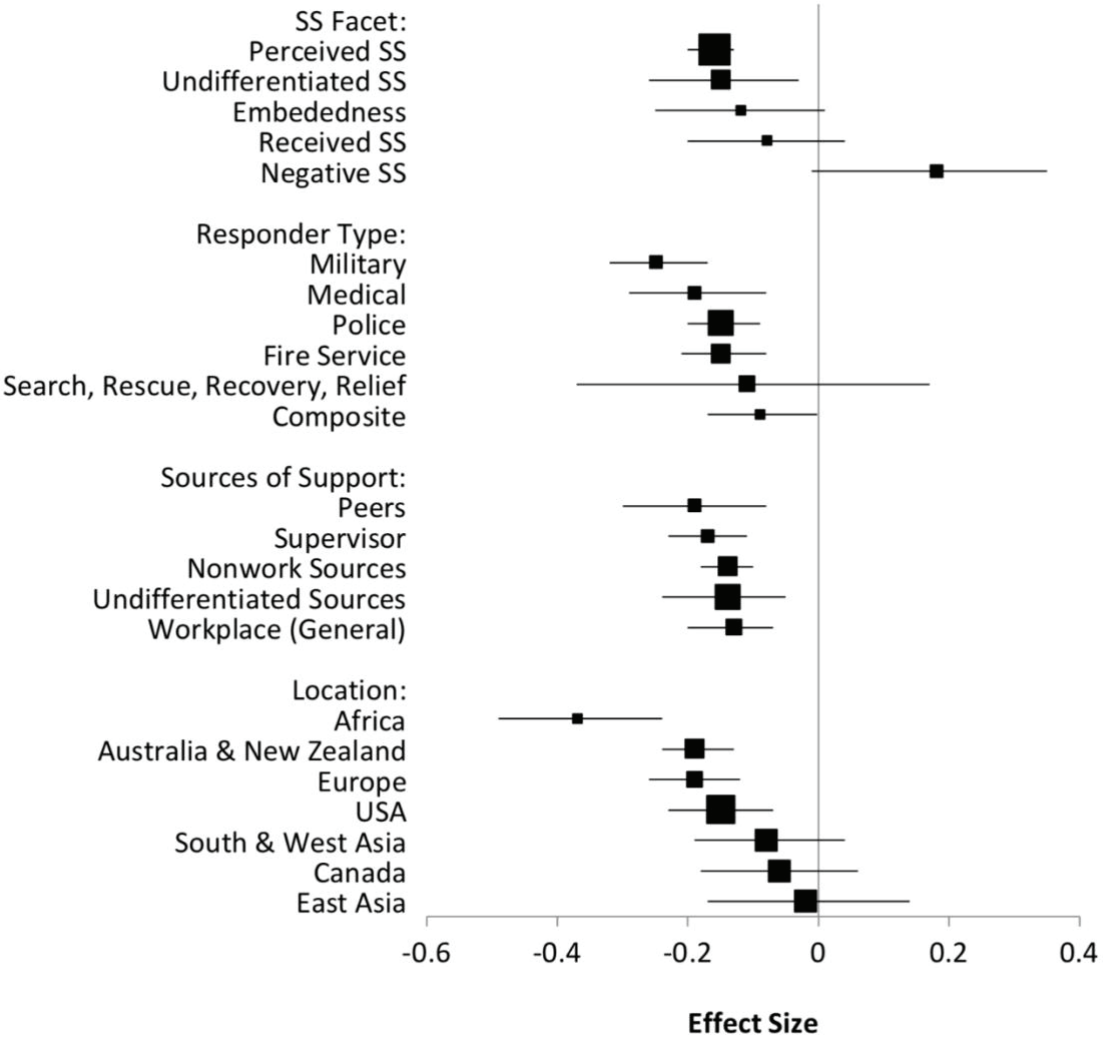

Fig. 3.2. Forest plot of social support effect sizes with 95% confidence intervals on total PTSS. Dot size indicates robustness of average effect size relative to other mean effect sizes, as indicated by the Rosenthal Fail-Safe N. This was constructed using Bailey's (2009) ForestPlot Tool.

Moderator analyses of social support and total PTSS

Syntheses of social support-total PTSS correlations were also performed according to type of responders, source of support, and study location. In these analyses, negative support and absence of support were excluded, as they conceptually have the opposite effect from the other facets of social support. Analyses on the correlation of general social support on the total PTSS in the different types of responders showed the largest effect on military responders at medium effect size ($\bar{r} = -.25, p < .001$). General social support was also found to be negatively correlated with lower PTSS scores in medical responders, to a weak-to-moderate extent ($\bar{r} = -.19, p = .001$). Correlations associated with the fire service ($\bar{r} = -.15, p < .001$) and with the police ($\bar{r} = -.15, p < .001$) were also weak but were more conclusive, with Fail-Safe Ns of 1132 and 4206, respectively. However, general social support-total PTSS correlation was in search, rescue, recovery, and relief workers was not supported by the findings. These results showed variations in correlations across the different types of responders. This was further supported by the wide range of confidence intervals for the composite category of responders (i.e., composed of different types of responders).

The different sources of social support were also found to have varying strengths of association with total PTSS. Peers ($\bar{r} = -.19, p = .001$) and supervisors ($\bar{r} = -.17, p < .001$) were found to be the sources of support that are most strongly correlated with lower PTSS levels, with small to medium effect sizes. On the other hand, nonwork sources ($\bar{r} = -.14, p < .001$) such as family and friends, and undifferentiated sources ($\bar{r} = -.14, p < .001$) had the most conclusive associations, with Fail-Safe Ns of 1683 and 4922, respectively. Generally, results showed having social support regardless of the source contributed to lower PTSS scores.

Examining the effect sizes, according to country/region, of social support associations with total PTSS showed medium to large effect size in African responders ($\bar{r} = -.37, p < .001$). Though this suggested that changes in PTSS levels in African emergency responders was explained significantly by changes in social support, the Fail-Safe N (68) with an $n = 2$ indicated the need for further studies in this sample. More conclusive results were obtained from studies in the USA ($Fail - Safe\ N = 8315$) and Australia and New Zealand ($Fail - Safe\ N = 1757$), with small to medium effect sizes. As with the other analyses, high social support score was associated with low total PTSS score. Syntheses of effect sizes in other countries/regions, such as in Asian countries, showed association of social support with total PTSS that spans both positive and negative values. These results indicate variation in social support-PTSS association depending on the location, and possibly, with the characteristics (e.g., culture, economic condition) associated with these countries/regions.

Analyses of social support facet effect sizes and PTSS clusters

A number of studies measured not just total PTSS but the different symptom clusters as well. Because of this, syntheses per symptom cluster was also performed (Table 3.3). However, with the fewer number of studies and consequently, effect sizes involved, the synthesised effect sizes were not as robust as those involving total PTSS. Generally, undifferentiated social support had synthesised effect sizes with avoidance ($\bar{r} = -.17, p = .007$) and intrusion and re-experiencing ($\bar{r} = -.14, p = .048$) symptoms that were much closer to those found with total PTSS. In spite of having the largest effect size in relation to total PTSS, variation in perceived social support was not correlated with the variation in any of the symptom clusters.

Table 3.3. Summary of social support facet effect sizes on PTSS symptom clusters

	n	k	$\bar{r}$ [95% CI]	p	χ^2	Fail-Safe N
Avoidance						
Undifferentiated SS	1	8	-.17 [-.29 to -.05]	.007	7.16	57
Perceived SS	5	6	-.08 [-.15 to .00]	.057	5.24	55
Received SS	1	1	-.23			
Hyperarousal						
Perceived SS	4	5	-.10 [-.20 to .00]	.050	2.80	35
Received SS	1	1	-.17			
Intrusion and Re-experiencing						
Undifferentiated SS	1	8	-.14 [-.28 to -.002]	.048	7.93	34
Perceived SS	5	6	-.07 [-.16 to .02]	.129	4.51	18
Received SS	1	1	-.17			

Note: n=number of studies; k=number of effect sizes, $\bar{r}$ =weighted average effect size; χ^2 df =k-1; SS=social support

Discussion

Exposure to traumatic events could leave lasting negative psychological impact, which may require some people to seek formal psychological intervention. Yet in the absence of psychotherapy and other similar forms of aid, which is usually the case in the aftermath of emergencies and disasters, many people rely on social support because it is a spontaneous and naturally occurring form of coping. The primary goal of this paper was to summarise the effects of social support on PTSS among emergency responders.

Generally, results show that emergency responders who have high levels of social support were observed to have lower levels of PTSS. An inspection of the different components of social support suggests that some supportive elements were more effective than others, and that some characteristics associated with emergency responders influenced the strength of these associations stronger than other characteristics. Generally, high level of social support was linked with low level of PTSS, but this link explained only a small amount of variance.

In comparison to other meta-analyses related to the scope of the present study, there were interesting divergences. For instance, Ozer et al. (2003), which focussed on perceived social support, found a larger effect size of $\bar{r} = -.28, 95\%\ CI\ [-.40\ to -.15]$ in comparison to perceived social support effect size, $\bar{r} = -.16, 95\%\ CI\ [-.20\ to -.13]$, found in the present study. The current study's synthesised effect sizes were also lower than those found by Brewin et al. (2000)'s meta-analysis, which reported weighted effect sizes of $\bar{r} = .40$ in the general sample, $\bar{r} = .43$ in the military sample, and $\bar{r} = .30$ in the civilian sample. In addition, Brewin et al.'s meta-analysis looked at the association of lack of support with PTSS while the current study explored the association between having social support and PTSS . Furthermore, consistent with the findings of Brewin et al. (2000), the current study found effect sizes associated with military responders to be larger than those associated with non-military responders.

The current study also reported results that are different from that of Guilaran et al. (2018) on disaster responders, which found no association between social support and PTSS. The current meta-analysis, however, differs in at least two ways. First, it did not focus only on disaster responders, but on emergency responders in general. Disasters are specific events that challenge community resources and affect the dynamics of social support mobilization (see Kaniasty & Norris, 1995, 2009). The meta-analysis conducted by Guilaran et al. (2018) showed that in the context of disasters, social support has limited effectiveness in reducing PTSS which accords with the small effect sizes found in the current study. Generally, social support has a small influence on the variance of PTSS, and in the context of disasters, this effect is further reduced. This indicates that other disaster-related factors such as the type of hazard that caused the disaster (e.g., natural, technological), magnitude of exposure, and multiplicity of exposure (Neria, Nandi, & Galea, 2008) may have stronger influence than social support on PTSS.

Second, Guilaran et al.'s (2018) meta-analysis summarised the effect of undifferentiated social support on the combination of total PTSS and symptom clusters. The current study, on the other hand, synthesised the effect sizes of the different components of social support with total PTSS and with symptom clusters. This isolated the differential effects of the different components of social support on PTSS and in effect, extended the findings of the previous meta-analysis. In this way the results of the current study complement the previous findings: some facets of social support influenced PTSS while some did not, and that some facets of support were associated with some symptoms while others were not.

In the context of similar meta-analyses, results of the current study support the Conservation of Resources (COR) theory (Hobfoll, 1989; Hobfoll, Freedy, Lane, & Geller, 1990). The COR theory frames social support as a resource and suggests that psychological distress is experienced when a person faces actual or perceived resource loss, or when a person fails to gain resources after considerable investment. The COR theory explains why lack of support, as shown by Brewin et al.'s (2000) study, produced a much larger effect size in relation to PTSS than other meta-analyses, including the present study, which focussed on the presence of support. These studies suggested that although presence of social support is associated with lower PTSS, the lack of support is a much stronger predictor of PTSS.

That perceived support had the largest effect sizes among the different support facets is not surprising. Perceived support, which is the subjective evaluation of the quality and availability of support when needed, is the social support component that conceptually has direct effects on psychological distress (see Kaniasty & Norris, 2009). However, while there is a proliferation of informative studies on perceived social support and undifferentiated social support, there is a lack of focus on the other support facets, particularly received social support and social embeddedness. This lack is a missed opportunity to learn more about how

the different elements of social support function, which could prove useful in designing supportive interventions for emergency responders.

At present, the effect of received support has been highly variable and elusive in the general literature (Wills & Shinar, 2000), and this is reflected in its relatively large confidence interval range found in the current study. This suggests that actual support per se may not be related to PTSS; that there may be some variables moderating the strength of its effect. For instance, Cutrona and Russell (1990) suggested that the effectiveness of received social support is highly influenced by how it fits the need for support. Rini and Dunkel Schetter (2010) further proposed that "support provided-support need" mismatch may even be harmful, which explains the positive association of received support with psychological distress in some studies, and in the case of the current study, PTSS. Other PTSS risk factors, such as socioeconomic status, gender, and previous trauma exposure (Brewin et al., 2000), should also be explored as moderators of the social support-PTSS link.

Analyses of effect sizes according to responder type highlight two points. First is the considerably larger effect size associated with military responders in comparison to non-military groups. This suggests a different set of social support dynamics existing within military organisations, and that military responders may be considered a group separate from non-military responders in this respect. In addition, military studies may be methodically better than those focussing on other types of emergency responders, perhaps due to better funding, better scales, high participation rates, among other advantages of working with well-funded, highly structured organisations. Second is that more homogeneous groups with relatively permanent/stable team members (e.g., police, firefighters) benefit more from social support in relation to PTSS than those with more temporary team members, such as teams in search, rescue, recovery, and relief work which are usually assembled as necessary (e.g., disasters). Logically, chances of emergency responders receiving support from team

members in the past is higher when they have been with the team for a longer time. Furthermore, their assessment of support availability from team members would be higher when they perceive longer term and more regular engagement, same as in the case of police responders and firefighters. In addition, emergency responders in more permanent teams have more stable structural support, which links to better social embeddedness.

Although the mean effect sizes were not very different, some sources of support had slightly larger effect sizes than others, as in the case of work sources of support. Studies on the effectiveness of the different sources of social support on psychological outcomes have produced a wide variety of results. For instance, support from family and friends were found to be a protective factor in some responders but not in others, and home support was linked with low PTSS scores in some studies but not in others (Brooks et al., 2016). However, there seems to be a consensus that support from the workplace provided significant mental health effects (Halbesleben, 2006). The preference for peer support after exposure to critical incidents (Alexander & Klein, 2001) was also supported by the findings of the current study, pointing to peer social support having the strongest association with low PTSS scores.

Slight differences in mean effect sizes were found between social support-PTSS studies across different geographic locations. An exception was the average effect size for African studies, with medium to large effect sizes, which clearly stood out in comparison to other effect sizes synthesised. Results suggest that social support may be more effective in some geographic areas than in others. Studies in the general population have found cultural differences in social support dynamics (Chen et al., 2012; Kim et al., 2008; Taylor, 2011; Taylor et al., 2004), and the findings of the current study affirm that.

One element of culture associated with social support dynamics is the degree of individualism-collectivism. Studies on social support and culture orientation have shown

social support to be a double-edged sword in collectivistic societies. For instance, in East Asian societies, maintenance of harmonious interdependence in social relationships is paramount (Chen et al., 2012), and social support seeking may cause more distress than comfort, as it potentially inconveniences another. This complexity in social support dynamics in East Asian cultures is exemplified by the crosscutting confidence intervals of social support association with PTSS among Chinese and Japanese emergency responders. On the other hand, culture orientation as a major moderator of social support-PTSS association is not supported by the current analyses, with the highly significant associations found in African emergency responders, who arguably also espoused collectivistic culture orientation. The findings of the study also suggest the presence of location-related moderating variables other than culture orientation.

Unfortunately, analyses on the link between social support facets and PTSS clusters were not as informative, due to the few studies investigating these associations. It is interesting to note, though, that the average effect size of perceived social support was significantly lower in relation to the symptom clusters than with total PTSS. This suggests that perception of support availability and quality was associated to a lesser extent with specific symptoms, but that these minute changes at the symptom level add up to have a slightly more significant impact at the syndrome level. On the other hand, the association of received support on the different symptom clusters needs more investigating. Single effect sizes associated with received social support and PTSS ranged from -.17 to -.23 in the symptom clusters in contrast to the effect size confidence interval (at 95%) of -.20 to .04 associated with total PTSS. However, these effect sizes were obtained from single studies, which clearly demands that more studies be performed to investigate the effect of received social support. Perhaps, what received social support lacks in effect at the total PTSS level it makes up for at the symptom level.

Limitations, recommendations, and future directions

This meta-analysis is the first of its kind to look into the association of the different components of social support on PTSS in emergency responders. However, the findings of this meta-analysis cannot assume a causal relationship between social support and PTSS. As an attempt to narrow the possibilities for conclusion, only studies where social support is framed as a predictor were included. Yet, given the design of the study, especially the lack of temporal elements in the analysis, it may well be that PTSS affects social support. Lack of social support may lead to psychological distress. Conversely, psychological distress may also lead to disruption in social processes (Goldmann & Galea, 2014) and consequently, an erosion in social support (Kaniasty & Norris, 2008).

Although careful considerations were made, there are also apparent overlaps in the effect sizes in the analyses, which adds to the study's limitations. In addition, some analyses had fewer studies involved than others, which impacts the generalizability of some synthesised effect sizes. The inclusion of the Rosenthal Fail-Safe N should be able to guide the readers as to the robustness of these weighted mean effect sizes. Furthermore, although exhaustive means of data extraction were performed, it is still more accurate to treat the articles included as a sample rather than as a census of all studies on the topic. One method that was found to be useful was looking into the citations for the identification of articles. The method of citation-based literature search added 15% of studies to the article pool for screening.

As social support is a multidimensional construct, what this means for research is that studies should be mindful of measuring social support in global terms. Looking at the different components of support would yield more meaningful results and would be more useful for designing social support interventions. More studies should also be conducted on the effectiveness of received support and social embeddedness.

Furthermore, the size of the effect of social support on PTSS should be taken into serious consideration. The results of this meta-analysis show that generally, social support is associated with lower levels of PTSS. However, these associations are mostly small, leaving a large amount of PTSS variance unexplained by the construct. That this meta-analysis found statistically significant effects may not necessarily translate to clinical significance (Jacobson & Truax, 1991). This means that although emergency responders benefit from having social support, this effect may be too small to create clinically noticeable change in PTSS levels. This suggests further testing of the effectiveness of social support in clinical populations.

Despite the small effect sizes, high social support levels have shown to be associated with low posttraumatic stress symptom levels. This is reason enough to continue exploring ways of optimizing the effectiveness of social support interventions. Some facets of social support were found to be more strongly linked with lower levels of PTSS than others. Similarly, some geographic contexts are found to benefit from social support more than others. Much of how social support works hinges on socio-cultural and even economic factors. As such, it would benefit the field to have more investigations on the effectiveness of social support across different socioeconomic and cultural contexts. A better understanding of the intricacies of the mechanisms of how social support works will provide insight into how to design interventions to help the helpers in the most effective and efficient way possible.

Supplementary Table. Summary of studies included in the meta-analysis

Authors (Year)	Design	Study Sample (n)	Location	Social Support Measures	PTSS Measures
Adriaenssens et al. (2012)	cross-sectional	emergency nurses (248)	Belgium	LQWQ for Nurses	IES
Alvarez & Hunt (2005)	cross-sectional	search and rescue workers (114)	USA	ISEL-6	PSS-Self Report
Armstrong et al. (2014)	cross-sectional	firefighters (218)	Australia	2-Way Social Support Scale	IES-Revised
Ask & Gudmundsdottir (2014)	longitudinal	rescue workers (465)	Denmark	Crisis Support Scale	Harvard Trauma Questionnaire
Barnes et al. (2013)	longitudinal	military (1039)	USA	Perceived Organizational Support Scale	PCL
Berninger et al. (2010)	longitudinal	firefighters (10074)	USA	single-item questionnaire[a]	PCL-Civilian
Bezabh et al. (2018)	cross-sectional	composite (660)	Ethiopia	Oslo 3-Item Social Support Scale	PCL-Civilian
Bowler et al. (2012)	longitudinal	police (2940)	USA	items on social integration[a]	PCL
Bromet et al. (2016)	longitudinal	police (2274)	USA	Range of Impaired Functioning Tool	PCL-S (event specific)
Carlier (1997)	longitudinal	police (262)	Netherlands	Dutch equivalent of ISEL	SI-PTSD
Chung et al. (2015)	cross-sectional	firefighters (185)	South Korea	Korean Occupational Stress Scale-Short Form	IES-Revised (Korean)
Cone et al. (2015)	longitudinal	police (2204)	USA	social support items[a]	PCL
Corneil et al. (1999)	cross-sectional	firefighters (828)	Canada	Work Environment Scale	IES
de Terte et al. (2014)	cross-sectional	police (176)	New Zealand	Social Support Scale	IES-Revised
Dickstein et al. (2010)	longitudinal	air force medical personnel (705)	USA	Unit Cohesion Scale	PCL-Military
Ehring et al. (2011)	cross-sectional	recovery workers (267)	Pakistan	Social Support Inventory	IES-Revised
Ellrich & Baier (2017)	cross-sectional	police (681)	Germany	social support items[a]	PTSS-10
Farnsworth & Sewell (2011)	cross-sectional	firefighters (225)	USA	Unsupportive Social Interactions Inventory	PCL-Civilian
Feder et al. (2016)	longitudinal	composite (4487)	USA	MOS-SSS	PCL-S (event specific)
Galovski et al. (2018)	longitudinal	police (255)	USA	MSPSS	PCL-5
Huang et al. (2013)	cross-sectional	rescue workers (1040)	China	Social Support Rating Scale	CAPS
Hunt et al. (2012)	longitudinal	search and rescue workers (85)	USA	ISEL-6	PSS-SR
Hyman (2004)	cross-sectional	police (133)	Israel	SSQ	IES-15
Jones & Kagee (2005)	cross-sectional	police (123)	South Africa	MSPSS	PSS-Self Report
Kaspersen et al. (2003)	cross-sectional	composite (213)	Norway	Social Network Support	PTSS-10
Liberman et al. (2002)	cross-sectional	police (733)	USA	NVVRS Social Support Subscale	Mississippi Combat Scale-Civilian Version
Maia et al. (2011)	cross-sectional	police (300)	Brazil	SOS Scale	PCL-Civilian

Marchand et al. (2015)	longitudinal	police (83)	Canada	Perceived Support Inventory	SCID-I, MPSS-SR
Marmar et al. (2006)	cross-sectional	police (715)	USA	SOS Scale	Mississippi Combat Scale-Civilian Version
Martin et al. (2009)	longitudinal	police (132)	Canada	Perceived Support Inventory	SCID-I
Maslow et al. (2015)	longitudinal	rescue workers (16488)	USA	social support items[a]	PCL-Civilian
McCanlies et al. (2017)	cross-sectional	police (113)	USA	ISEL	PCL-Civilian
Ménard & Arter (2013)	cross-sectional	police (750)	USA	Measure of relational strain	PCL-Civilian
Meyer et al. (2012)	cross-sectional	firefighters (142)	USA	ISEL	CAPS, PCL-Civilian
Mitani et al. (2006)	cross-sectional	firefighters (243)	Japan	Japan Brief Job Stress Questionnaire	IES-Revised (Japanese)
Mitani (2008)	cross-sectional	firefighters (131)	Japan	Japan Brief Job Stress Questionnaire	IES-Revised (Japanese)
Murphy et al. (2004)	longitudinal	firefighters (73)	USA	visual analogue scale (0-100)	IES-15
Ogińska-Bulik (2015)	cross-sectional	emergency services workers (200)	Poland	What Support You Can Count On	IES-Revised
Pietrzak et al. (2012)	cross-sectional	police (8466)	USA	social support items[a]	PCL-S (event specific)
Pietrzak et al. (2014)	longitudinal	composite (10835)	USA	social support items[a]	PCL-S (event specific)
Razik et al. (2013)	cross-sectional	rescue workers (125)	Pakistan	Social Support Inventory	IES-Revised
Regehr et al. (2003)	cross-sectional	firefighters (123)	Australia	SPS, social support items[a]	IES
Regehr (2009)	cross-sectional	firefighters (164)	Australia	SPS	IES
Regehr et al. (2013)	cross-sectional	police communicators (113)	Australia	SPS	IES-Revised
Saijo et al. (2012)	cross-sectional	firefighters (1667)	Japan	US NIOSH-GJSQ	IES-Revised (Japanese)
Sattler et al. (2014)	cross-sectional	firefighters (286)	USA	social support items[a]	PTSS items[a]
Schenk et al. (2017)	cross-sectional	medical rescue workers (337)	China	social support items[a]	IES-Revised
Schwarzer et al. (2014)	longitudinal	police (2943)	USA	social support items[a]	PCL-S (event specific)
Schwarzer et al. (2016)	longitudinal	police (2204)	USA	MSSS	PCL-Civilian
Shakespeare-Finch et al. (2015)	cross-sectional	emergency medical dispatchers (60)	Australia	2-Way Social Support Scale	IES-Revised
Shi et al. (2017)	cross-sectional	healthcare workers (2706)	China	Social Support Rating Scale	PCL-Civilian
Skogstad et al. (2016)	cross-sectional	composite (1790)	Norway	social support items[a]	PCL
Smith et al. (2011)	cross-sectional	firefighters (124)	USA	ISEL-12	Posttraumatic Diagnostic Scale
Soffer et al. (2011)	cross-sectional	rescue workers (20)	Israel	social support items[a]	IES-Revised
Somville et al. (2016)	cross-sectional	emergency physicians (152)	Netherlands	LQWQ for Physicians	IES
Stephens et al. (1997)	cross-sectional	police (527)[b]	New Zealand	Social Support Scale	M-PTSD
Stephens & Long (1999)	cross-sectional	police (527)[b]	New Zealand	Social Support Scale	M-PTSD
Weiss et al. (1995)	cross-sectional	composite (367)	USA	NVVRS Social Support Subscale	IES-Revised
Wilson et al. (1997)	cross-sectional	police (95)	UK	Crisis Support Inventory	Modified PSS-SR
Yuan et al. (2011)	longitudinal	police (233)	USA	SOS Scale	Civilian Mississippi Scale

Note: [a]Researcher-made; [b]different samples were used in the analyses

Social support Scales: LQWQ=Leiden Quality of Work Questionnaire; ISEL=Interpersonal Evaluation List; MOS-SSS=Medical Outcomes Study-Social Support Scale; MSPSS=Multidimensional Scale of Perceived Social Support; SSQ=Social Support Questionnaire; NVVRS=National Vietnam Veterans Readjustment Study; SOS=Sources of Support; SPS=Social Provisions Scale; US NIOSH-GJSQ=US National Institute of Occupational Safety and Health Generic Job Stress Questionnaire; MSSS=Modified Social Support Survey

PTSS Scales: IES=Impact of Event Scale; PSS-SR=Posttraumatic Stress Disorder Symptom Scale Self-Report; PCL=PTSD Checklist; SI-PTSD=Structured Interview for PTSD; PTSS-10=Post-traumatic Stress Scale-10; CAPS=Clinician-Administered PTSD Scale; SCID=Structured Clinical Interview for DSM IV Axis I Disorders; M-PTSD=Mississippi PTSD Scale

Chapter Four: Reflections and research direction

Social support is generally associated with more positive outcomes and fewer negative outcomes. While studies on the disaster and emergency survivor populations have consistently shown a positive link between social support and positive psychological outcomes, this relationship has been inconsistent in the context of emergency responders. The literature reviewed and the two meta-analyses made salient several issues in the study of social support in emergency responders. These issues may be clustered into four.

1. There is a dearth of studies on received social support. Most of the studies on social support focus on perceived social support. Studying perceived support is undeniably important, but from an intervention point-of-view, the type of support that can be externally controlled is received social support. There are mixed results on the relationship of received support and psychological outcomes, but it also offers a promising prospect in the prevention of posttraumatic stress symptoms (PTSS).
2. The social dimension of well-being has been neglected in the psychological literature. Individuals do not exist in a void, and are affected by the different social forces. Conversely, the individual's internal states may also affect his/her social health. In the same vein, this may be affected by the amount and/or quality of social support the individual receives/perceives, which warrants the exploration of this facet.
3. There are limited studies on social support in emergency first responders. Most of what we know about social support in emergencies and disasters is from studies concerning the survivors (e.g., general population, Norris & Kaniasty, 1996; Platt, Lowe, Galea, Norris, & Koenen, 2016). We also know, however,

that emergency responders differ significantly from the rest of the population, especially in terms of the effect of social support on PTSS (Brewin et al., 2000; Ozer et al., 2003). With social support considered as a cornerstone of psychosocial recovery in posttraumatic contexts, there is a need to examine how these supportive interactions influence posttraumatic outcomes in emergency responders.

4. There are not many studies that look into the ethnic differences in social support. It is highly likely that social support, being a social psychological construct, is influenced by ethnicity-related variables, and several studies already have shown ethnicity differences in social support dynamics. However, very few studies of such kind exist in the disaster and emergency literature.

Several observations from the meta-analyses and from the general reading of the literature guided the development of the study proper (manuscripts three to five). The first meta-analysis surveyed the literature on the associations between social support components and the different psychological outcomes in emergency responders working in the aftermath of disasters. The second meta-analysis casted a wider net in terms of the support recipient and focussed on emergency responders working in various settings, but narrowed the scope of the psychological outcome to posttraumatic stress symptoms. The changes in the second meta-analysis were guided by the observations in the first meta-analysis.

1. A large percentage of studies focus on PTSS but the association of social support with this outcome is inconsistent, suggesting either the absence of effect or the existence of moderators affecting the strength or direction of its effect. PTSS is one of the most observed clinical consequences of emergency response, and social support is hailed as a protective factor against PTSS. However, the

results of the first meta-analysis do not support such claims, which prompted the focus on PTSS for the second meta-analysis, with the inclusion of moderator analyses.

2. Disaster responders are a special type of emergency responders who work in highly critical situations. The second meta-analysis included emergency responders outside the disaster context.

In these two meta-analyses, there were several gaps on received social support research based on the disproportionate number of studies (in comparison to those focussing on perceived social support); hence, the associations with this social support facet found in these meta-analyses were far from conclusive. This formed the basis for the focus on received social support in the succeeding manuscripts. Second, the associations with PTSS were inconsistent in both meta-analyses, which, again, suggested either the absence of effect or the presence of moderators stirring the direction of effect. For this reason, the succeeding studies focussed on examining the differential effects of the different components of received social support. One of the observations in the second meta-analysis was the differences in the magnitude of effect across different countries. This prompted the inclusion of testing of ethnicity as a control variable in manuscripts three and four. The second meta-analysis also showed differences in the magnitude of association across different sources of social support; hence, the differential effects of various received support sources were tested for manuscripts three, four, and five. The absence of studies focussing on positive and/or social psychological consequences of emergency response work propelled the inclusion of social adjustment as an outcome of interest for manuscript four.

Finally, whereas received social support associations were inconsistent, high perceived social support scores were consistently associated with low levels of negative outcomes

(including PTSS) and high levels of positive outcomes. As discussed earlier, received social support in itself may have direct effects on psychological outcomes. However, it may also have indirect effects through perceived social support. The study, then, also aimed to understand the processes underlying the connection between received social support and perceived social support to allow for a better understanding of how provision of support impacts the perception of support by emergency responders.

Chapter Five: Received social support and posttraumatic stress symptoms in New Zealand and Philippine emergency responders

Abstract

Emergency responders are at risk of posttraumatic stress symptoms (PTSS). In the face of trauma, social support has been associated with fewer negative outcomes. However, the effectiveness of received social support remains unclear. This cross-sectional study tested the moderating effect of received support and its components on traumatic exposure and PTSS. Responders from New Zealand and the Philippines ($n = 223$) answered an online questionnaire measuring social support and PTSS. When controlling for demographic variables and trauma exposure, global received support explained PTSS variance ($B = -2.94, p = .001$). Analyses of sources and forms of received support revealed peer, supervisor, emotional, and tangible support to have main effects on PTSS. However, supervisor support was also found to have reverse buffering effect ($B = 2.11, p = .013$). All main and, aside from supervisor support, all interaction effects of received support disappeared when perceived social support was added to the models. Findings generally support the main effects model of received support on PTSS, and shed light on the limitations of received support effectiveness.

Introduction

In the aftermath of crises and disasters, emergency responders are usually the first on the scene, potentially exposing themselves to the most gruesome features of these incidents. Emergency responders are professionals whose job is to protect and preserve life, property, and the environment in the aftermath of disasters and emergencies (Prati & Pietrantoni, 2010b). Being exposed to these events puts them at risk of developing a wide range of

mental health issues, including posttraumatic stress symptoms (PTSS) (Bromet et al., 2016; Cukor et al., 2011). PTSS are some of the more commonly observed psychological consequences of exposure to these critical incidents. It has been observed among emergency responders such as the police (e.g., de Terte, Stephens, & Huddleston, 2014), firefighters (e.g., Carpenter et al., 2015), and emergency medical personnel (e.g., Carmassi et al., 2016).

For those in highly demanding occupations, particularly in jobs dealing with traumatic events, having access to social support has long been conceived as a protective factor against the development of serious psychological consequences such as PTSS and general psychological distress (Arnberg, Hultman, Michel, & Lundin, 2012). Furthermore, deficits in support is an important risk factor for the development of PTSS (Brewin et al., 2000; Ozer et al., 2003). Social support has been routinely referred to as interpersonal connections that provide people with actual help and embed them into a web of social relationships appraised as loving, caring, and readily available in times of need. This definition captures three important facets of social support: the actual receipt of support ("received social support"), the perception of availability of support ("perceived social support"), and the interconnections within a network social relationships ("social embeddedness") (Kaniasty & Norris, 2009). Both received and perceived social support may take on different types: emotional support (e.g., expressions of comfort, warmth), tangible support (e.g., practical and instrumental support), or informational support (e.g., advice, guidance) (see Gottlieb, Cohen, Underwood, & Gottlieb, 2000).

Despite these distinctively different manifestations, studies that tend to treat social support as a generic construct are all too common in the literature. For example, the term "social support" has been too often considered as synonymous with "perceived social support," as evidenced by the dominance of studies measuring perception of support availability and

quality but are labelled as "social support" (see Brewin et al., 2000; Ozer et al., 2003; Prati & Pietrantoni, 2009). Furthermore, evidence suggests that different types of support (i.e., emotional, informational, tangible) and different sources of support (e.g., partner, family, co-workers) influence psychological outcomes in varying degrees (Donnelly, Bradford, Davis, Hedges, & Klingel, 2016; Halbesleben, 2006; Harris, Winskowski, & Engdahl, 2007; Prati & Pietrantoni, 2010b).

Whereas many social support investigations tend to operationalize social support as an undifferentiated blend of its perceived, received and structural features, several empirical studies have shown that the different types of support contribute to psychological outcomes in different ways. For example, received social support, which is usually measured by recalling specific supportive behaviours, have more inconsistent associations with positive outcomes compared to perceived social support, which is usually measured by rating general impressions and assessments of supportive events (Haber et al., 2007). These differences in effect sizes were also observed in the context of emergency responders. Prati and Pietrantoni (2010a) found that perceived social support explained a larger amount of variance in negative psychological outcomes than received social support. Although it is clear from a diversity of studies that social support has various sub-constructs and that these sub-constructs influence psychological outcomes in different ways, there is still the proliferation of social support research ignoring these differential effects, and treating social support as a unidimensional variable (see Guilaran et al., 2018). This article focusses on received social support, which is the often-neglected facet of this meta-construct.

The effects of social support on physical and mental health, have been conventionally formulated in two major ways. Originally, social support was thought to buffer the negative effects of stress on health (Cobb, 1976), and this idea of a moderating effect sparked the

interest in scientific investigations in the area. The buffering effects model suggests that social support is beneficial only when one is exposed to stressful events (Cohen & Wills, 1985). For example, social support was observed to buffer the effects of traumatic exposure on PTSS, where PTSS increased as traumatic exposure increased in low support, but not in high support conditions (Kaspersen et al., 2003). Lower levels of stress were also observed in police officers with high social support following response work after the World Trade Centre attacks (Schwarzer et al., 2014). On the other hand, social support is also found to have main effects on health outcomes (e.g., La Rocco & Jones, 1978; Schaefer, Coyne, & Lazarus, 1981). This model suggests that social support is linked to improvement in health and wellbeing, regardless of conditions of stress. For example, high level of support was associated with reduction in job- and health-related strains in social workers, regardless of the level of stress experienced (El-Bassel, Guterman, Bargal, & Su, 1998). Social support was also found to be positively correlated with posttraumatic growth and negatively correlated with posttraumatic stress disorder in emergency medical dispatchers (Shakespeare-Finch et al., 2015). These two competing models have dominated the narratives on social support effectiveness literature, although there are some suggestions that these differences in effects boil down to the differential influence of the various social support facets (i.e., social embeddedness having main effects, perceived social support having buffering effects; see Kawachi & Berkman, 2001).

Another issue is that most of these investigations focus on perceived social support and disregard the contributions of received social support to health and wellbeing outcomes. This is particularly limiting as people often provide and receive social support in the aftermath of emergencies and disasters; hence, it is necessary to identify the elements of received social support that lead to favourable outcomes. The present study tested for both the main and moderating effects of received social support and its different forms and sources on PTSS.

Method

Participants

The study sample included 223 emergency responders from New Zealand and the Philippines who were affiliated with an emergency response organisation at the time of participation. One hundred ninety five emergency responders were based in New Zealand, 28 in the Philippines; 48 and 171 identified as females and males, respectively. The majority (n=152) identified as New Zealanders of European descent; the rest were Asians (n=29), New Zealanders of mixed or Maori ethnicities (n=22), Europeans and North Americans (n=14), and Australians/Pasifika (n=8). Mean age of participants was 43.19 years (SD=12.10). Most of them were affiliated with the fire service (n=157, 70% of sample). Thirty-six were employed in the medical services (16% of sample), 13 in emergency and disaster management organisations (6%), 10 in the police (5%), 4 in search and rescue groups, and three in other allied professions.

Procedure

The study was cross-sectional. Participants were recruited and data were collected from 1 May until 31 December 2017. Recruitment was conducted through social media postings and through internal communication in various emergency response organisations. Although most participants opted to participate through the online format, the paper-and-pencil option was also available. The questionnaire measured flourishing, perceived social support, traumatic exposure, PTSS, psychological distress, work and social impairment, received social support, support effectiveness, support consequence, normative stress, posttraumatic relationship growth, and religious activities; and required approximately 40 to 60 minutes to finish. Almost all participants (222/223) participated through the online questionnaire.

Participants signed an informed consent form prior to participation. The study received ethics approval from the Massey University Human Ethics Committee (see Appendix C).

Measures

Exposure to traumatic events

The Life Events Checklist for DSM-5 (LEC-5) (Weathers, Blake, et al., 2013) lists 16 traumatic events and one open-response event (for any other event not specified in the list). The standard LEC-5 was modified such that participants were asked separately and sequentially to indicate the traumatic event(s) that they have been exposed to (1) in their lifetime outside of their work as emergency responders (LEC-5 lifetime); and, (2) as part of their work as emergency responders (LEC-5 duty-related). Scores ranged from 0 (no exposure) to 17 (exposure to all events in the list). LEC-5 (duty-related) was the main predictor. Gray, Litz, Hsu, and Lombardo (2004) reported the LEC items to have kappa reliability coefficients (except for "caused serious injury/death of another") greater than .50, an average kappa reliability coefficient of .61, and a test-retest correlation of .82 (one week interval) for 108 college undergraduates.

PTSS

Anchored on the worst event specified in the LEC-5 (duty-related), participants were asked 20 questions that assessed posttraumatic stress disorder symptoms using the PTSD Checklist for DSM-5 (PCL-5) (F. W. Weathers, Litz, et al., 2013). The scale provides a sum score for total PTSS; its items were answered using a five-point scale, ranging from "not at all" (0) to "extremely" (4), and participants indicated the extent of their agreement to each of the statements within the past month. The current study found a Cronbach's alpha of .95 for total PTSS score (possible range of scores = 0 to 80). Preliminary work suggested a score of 38

and above may satisfy provisional diagnosis of PTSD (Blevins, Weathers, Davis, Witte, & Domino, 2015).

Received Social Support

The Berlin Social Support Scale (BSSS) Recipient Version (Schwarzer & Schulz, 2000) was used to measure received social support in the last four weeks. The scale was modified to have a 5-point frequency response continuum (i.e., never =1, rarely =2, sometimes=3, often=4, and always=5, average score range of 1 to 5) rather than the original agreement-disagreement continuum. Received support from three sources was assessed: (1) close family member, (2) peers/colleagues, and (3) immediate supervisor. The global received support score was computed by averaging family, peers, and supervisor support scales.

The BSSS has 14 items measuring three forms of received social support: emotional (9 items), informational (2 items), and tangible (3 items). The scores in the current study, which included all 14 items for each support source, had the following Cronbach's alphas: .94 (family support), .92 (peer support); and, .94 (supervisor support). Cronbach's alpha was also calculated for each support type (emotional support, .92; instrumental support, .84; and, informational support, .79). Overall coefficient alpha for global received support (all sources) was .95.

Statistical control variables

The study aimed to isolate unique effects of duty-related traumatic exposure and received social support on PTSS; hence, several control variables were included in the model. Demographic variables—gender, years of service, civil status (with or without a partner), and ethnicity (NZ -European or non-NZ (European))—were included as statistical controls. Gender, civil status, and ethnicity were dummy-coded.

In addition to the demographic variables, the effect of duty-related traumatic exposure was also controlled for the effects of lifetime trauma exposure, using the LEC-5 (lifetime), and normative stressful experiences, using the Life Events List (LEL, (Cohen, Tyrrell, & Smith, 1991; Common Cold Project, n.d.). This LEL assessed the frequency of normative stressful life events (e.g., moving/changing residence, breaking up with a close friend) in the past 12 months, using yes-no response choices. Scores may range from 0 to 24. For this study, the probe questions that originally come with the scale were excluded. LEL and LEC-5 (lifetime) were added in the model to test the effect of LEC-5 (duty-related) on PTSS independent of the variance contribution of non-duty-related stress.

The Interpersonal Support Evaluation List-12 (ISEL-12, S. Cohen, Mermelstein, Karmarck, & Hoberman, 1985) was used to assess perceived social support. This abbreviated version of the original 40-item ISEL measures with 12 items perception of availability of support, using a four-point response format, ranging from "definitely false" (=1) to "definitely true" (=4) (average score range of 1 to 4). In the present study, the scale had a Cronbach's alpha of.88.

Finally, ethnicity was included as one of the demographic statistical controls, as there is evidence suggesting ethnicity and/or cultural variables influences the dynamics of social support mobilisation, utilisation, and effectiveness (e.g., Chen et al., 2012; Kaniasty & Norris, 2000). Ethnicity was coded "1" for participants who identified themselves as New Zealanders with European descent. Otherwise, they were coded as "0." This coding was prompted by the dominance of NZ (European) participants in the sample. Participants who identified with other ethnicities were formed another category ("Non-NZ (European)" ethnicity), with the NZ (European) sample treated as a comparison group.

Statistical analyses

The variance in PTSS explained by the predictor variables—duty-related traumatic exposure and received social support—was tested using hierarchical regression analyses. The clustering and ordering of blocks was guided by theoretical and logical considerations. Demographic variables were entered in Block 1, followed by LEC-5 (lifetime) and LEL, which measure non-duty-related stress, in Block 2. To test for the effects of duty-related traumatic exposure and received social support, LEC-5 (duty-related) and BSSS were entered in Block 3, followed by the interaction of the two variables in Block 4. Finally, ISEL-12 was entered in Block 5 to test the variance explanation of received social support when perceived social support is entered in the equation. This analysis structure was performed for global received social support, the different sources of received support, and the different forms of received support. Interaction effects were graphed, and simple slopes were analysed, using ModGraph (Jose, 2013b). Data points three standard deviations away from the mean were deemed outliers following the Three Sigma Rule (Pukelsheim, 1994). No outliers (casewise deletion, 3 SDs) were found in the analyses. Data analyses were performed using the Statistical Package for Social Sciences (SPSS) version 25.

Missing data

To deal with the missing data, multiple imputation-Markov chain Monte Carlo (MI-MCMC) was used after performing a missing values analysis (MVA) and running Little's MCAR Chi-square test through the expectation-maximization (EM) algorithms (400 iterations) to ensure missing data are, at the very least, missing at random (MAR). Five imputations were generated, following the recommendations of Graham, Olchowski, and Gilreath (2007) in order to preserve statistical power after imputations. MI-MCMC was done at the scale level.

Only participants with at least 95% completion rate at the scale level were included in the MI procedure.

Results

Correlations

Correlation analyses (Table 5.1) showed moderate to high correlations between received social support and perceived social support. Received emotional support was most strongly positively correlated with perceived social support ($r = .52, p < .001$) while informational support had the weakest correlation with perceived support ($r = .32, p < .001$). Nevertheless, high amounts of received social support, regardless of the form, were observed along with the positive perception of support quality and availability. Duty-related traumatic exposure was negatively correlated with received social support variables (except with informational support), but not with perceived support. Received and perceived social support were negatively correlated with PTSS, although perceived social support had the larger effect size between the two support facets. Furthermore, years of service in emergency response is negatively correlated with received social support but is not associated with perceived social support nor with PTSS.

Table 5.1. Correlation matrix

	n	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Gender (M=1, F=2)	219	1.22	0.41															
2. Years of Service	223	18.11	13.45	-.35***														
3. Civil status (w/ partner=1)	223	1.79	0.41	-.28***	.29***													
4. Ethnicity (NZ-Euro=1)	223	0.68	0.47	-.15*	.25***	0.001												
5. Lifetime TE	223	5.50	3.14	-0.02	0.11	0.02	0.01											
6. Normative Stress	223	4.65	3.15	.14*	-.28***	-.24***	-0.01	.14*										
7. Duty-related TE	223	7.58	3.32	-.18**	.13	.14*	.35***	.40***	0.03									
8. Global RSS	222	3.30	0.68	0.12	-.21**	-0.07	-.21**	-0.003	0.04	-.22**								
9. Family RSS	221	3.53	0.89	0.13	-.19**	0.01	-.19**	-0.03	0.003	-.21**	.74***							
10. Peer RSS	220	3.29	0.78	0.08	-0.14*	-0.10	-.16*	-0.04	0.02	-.16*	.82***	.36***						
11. Supervisor RSS	219	3.08	0.89	0.11	-.22**	-0.12	-.17*	0.04	0.11	-.16*	.84***	.38***	.63***					
12. Emotional RSS	223	3.50	0.68	.15*	-.22**	-0.08	-.23**	-0.01	0.06	-.25***	.97***	.72***	.80***	.82***				
13. Tangible RSS	223	3.06	0.79	0.05	-.14*	-0.04	-.16*	0.01	-0.01	-.18**	.89***	.68***	.71***	.74***	.80***			
14. Informational RSS	223	2.76	0.87	0.09	-.20**	-0.07	-0.13	0.01	0.06	-0.12	.83***	.62***	.65***	.71***	.73***	.71***		
15. Perceived SS	223	3.15	0.53	0.07	-0.08	.17*	-0.11	-0.04	-0.06	-0.08	.49***	.41***	.47***	.32***	.52***	.42***	.32***	
16. PTSS	223	11.75	12.96	0.09	-.13	-.28***	-0.02	0.11	.19**	0.08	-.19**	-.134*	-.129	-.17*	-.21**	-.17*	-0.06	-.39***

*p<.05, **p<.01, ***p<.001; correlations were calculated using imputed dataset; TE=traumatic exposure; RSS=received social support; SS=social support; PTSS=posttraumatic stress symptoms

Main effects of duty-related traumatic exposure and received social support

Hierarchical regression analysis showed that global received social support predicted PTSS scores even when controlled for the effects of the demographic variables, normative stress, and traumatic exposure (Table 5.2). High amounts of global received social support in emergency responders were linked with low levels of total PTSS. However, the effect of received social support disappeared when perceived social support was added in the equation. In order to isolate the effects of the different components of received social support on PTSS, separate hierarchical regression analyses involving the different sources and forms of received support were conducted. Consistent with the findings involving global received social support, positive changes in the level of the different sources of received support were found to predict lower levels of PTSS. High amounts of received peer support (Table 5.3.2) and supervisor support (Table 5.3.3) were associated with less intense PTSS. Low PTSS was also observed along with high amounts of received emotional support (Table 5.4.1) and tangible support (Table 5.4.2). However, changes in the amount of family received support (Table 3.2.1) and informational (e.g., advice) support (Table 5.4.3) did not account for the changes in PTSS score. Furthermore, all main effects of received social support disappeared when perceived social support was added in the regression models.

Table 5.2. Hierarchical regression analysis of global received social support on PTSS (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.94	2.24	.674	0.80	2.22	.719	1.36	2.19	.534	1.34	2.19	.541	2.05	2.09	.327
Years of Service	1.23	0.95	.194	1.54	0.97	.112	1.21	0.96	.209	1.33	0.97	.171	1.19	0.93	.199
Civil Status (with partner=1)	-9.36	2.20	<.001	-8.57	2.21	<.001	-9.04	2.17	<.001	-9.01	2.17	<.001	-6.81	2.14	.001
Ethnicity (NZ-Euro=1)	-1.21	1.87	.519	-1.39	1.86	.454	-3.18	1.96	.105	-3.30	1.97	.093	-3.26	1.88	.083
Lifetime TE				1.02	0.85	.228	0.62	0.92	.503	0.65	0.92	.480	0.42	0.88	.634
Normative stress				1.89	0.89	.035	1.84	0.87	.035	1.88	0.87	.032	1.69	0.84	.043
Duty-related TE							1.15	0.99	.245	0.88	1.04	.395	1.15	0.99	.247
Global RSS							-2.65	0.86	.002	-2.61	0.86	.002	-0.53	0.94	.573
Duty-related TE X Global RSS										0.83	0.91	.358	0.44	0.87	.612
Perceived SS													-4.18	0.93	<.001
R (sq)	.08			.11			.16			.17			.24		
F for change in R (sq)	4.99			3.51			6.29			0.84			20.38		
F Change Significance	<.001			.032			.002			.500			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support; PTSS=posttraumatic stress symptoms

Table 5.3.1. Hierarchical regression analysis of received family support on PTSS (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.90	2.25	.690	0.77	2.23	.730	1.44	2.24	.521	1.42	2.25	.527	2.04	2.11	.333
Years of Service	1.24	0.96	.196	1.55	0.98	.113	1.40	0.98	.153	1.40	0.98	.154	1.20	0.93	.196
Civil Status (with partner=1)	-9.30	2.21	<.001	-8.54	2.22	<.001	-8.71	2.22	<.001	-8.68	2.24	<.001	-6.63	2.15	.002
Ethnicity (NZ-Euro=1)	-1.12	1.88	.552	-1.32	1.87	.479	-2.87	2.01	.152	-2.92	2.05	.154	-3.19	1.93	.098
Lifetime TE				1.00	0.86	.243	0.37	0.95	.700	0.36	0.95	.706	0.25	0.90	.777
Normative stress				1.85	0.90	.039	1.82	0.89	.041	1.81	0.89	.042	1.67	0.84	.047
Duty-related TE							1.49	1.04	.150	1.47	1.06	.164	1.49	1.00	.136
Family RSS							-1.47	0.87	.092	-1.47	0.87	.092	0.30	0.89	.735
Duty-related TE X Fam RSS										0.11	0.88	.903	0.18	0.83	.833
Perceived SS													-4.59	0.88	<.001
R (sq)	.08			.11			.13			.13			.23		
F for change in R (sq)	4.86			3.33			2.90			0.01			27.38		
F Change Significance	<.001			.038			.057			.903			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support; PTSS=posttraumatic stress symptoms; Fam=family

Table 5.3.2. Hierarchical regression analysis of received peer support on PTSS (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.66	2.25	.770	0.54	2.24	.809	1.00	2.22	.652	1.04	2.23	.641	2.08	2.12	.326
Years of Service	1.25	0.96	.195	1.50	0.98	.127	1.45	0.98	.139	1.40	0.98	.154	1.12	0.93	.230
Civil Status (with partner=1)	-8.99	2.22	<.001	-8.29	2.22	<.001	-9.05	2.22	<.001	-9.02	2.23	<.001	-6.31	2.17	.004
Ethnicity (NZ-Euro=1)	-0.91	1.88	.630	-1.08	1.87	.564	-2.67	2.02	.187	-2.63	2.03	.194	-2.81	1.92	.142
Lifetime TE				1.18	0.86	.169	0.58	0.95	.539	0.53	0.96	.580	0.39	0.91	.670
Normative stress				1.70	0.90	.060	1.70	0.89	.056	1.67	0.90	.064	1.49	0.85	.080
Duty-related TE							1.31	1.03	.201	1.40	1.05	.181	1.54	0.99	.121
Peer RSS							-1.87	0.85	.028	-1.92	0.86	.026	0.24	0.92	.795
Duty-related TE X Peer RSS										-0.35	0.82	.670	-0.66	0.78	.398
Perceived SS													-4.71	0.93	<.001
R (sq)	.08			.10			.13			.13			.23		
F for change in R (sq)	4.40			3.32			3.52			0.18			25.84		
F Change Significance	.002			.038			.031			.670			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support; PTSS=posttraumatic stress symptoms

Table 5.3.3. Hierarchical regression analysis of received supervisor support on PTSS (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	1.03	2.27	.652	0.95	2.26	.674	1.31	2.21	.552	1.74	2.19	.426	2.56	2.09	.220
Years of Service	1.43	0.97	.140	1.70	0.99	.084	1.35	0.98	.165	1.78	0.98	.070	1.47	0.94	.117
Civil Status (with partner=1)	-9.31	2.22	<.001	-8.51	2.23	<.001	-9.30	2.20	<.001	-9.45	2.17	.000	-7.08	2.13	.001
Ethnicity (NZ-Euro=1)	-1.36	1.90	.475	-1.48	1.89	.433	-3.27	2.01	.104	-2.92	1.99	.143	-3.12	1.90	.100
Lifetime TE				1.10	0.86	.204	0.68	0.95	.472	0.77	0.94	.409	0.66	0.89	.457
Normative stress				1.83	0.90	.043	1.95	0.88	.027	2.03	0.87	.020	1.77	0.83	.033
Duty-related TE							1.32	1.02	.196	0.66	1.04	.524	0.74	0.99	.454
Supervisor RSS							-2.69	0.86	.002	-2.73	0.85	.001	-1.43	0.86	.096
Duty-related TE X Sup RSS										2.11	0.85	.013	1.60	0.82	.049
Perceived SS													-3.98	0.85	<.001
R (sq)	.08			.11			.16			.19			.26		
F for change in R (sq)	4.91			3.43			6.34			6.22			21.69		
F Change Significance	<.001			.034			.002			.013			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support; PTSS=posttraumatic stress symptoms; Sup=supervisor

Table 5.4.1. Hierarchical regression analysis of received emotional support on PTSS (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.94	2.24	.674	0.80	2.22	.719	1.55	2.17	.475	1.54	2.18	.478	2.09	2.09	.317
Years of Service	1.23	0.95	.194	1.54	0.97	.112	1.15	0.95	.227	1.27	0.96	.189	1.14	0.93	.218
Civil Status (with partner=1)	-9.36	2.20	<.001	-8.57	2.21	<.001	-8.97	2.16	<.001	-8.94	2.16	<.001	-6.90	2.13	.001
Ethnicity (NZ-Euro=1)	-1.21	1.87	.519	-1.39	1.86	.454	-3.30	1.95	.090	-3.47	1.96	.076	-3.35	1.89	.076
Lifetime TE				1.02	0.85	.228	0.65	0.91	.475	0.69	0.92	.450	0.46	0.88	.602
Normative stress				1.89	0.89	.035	1.88	0.87	.030	1.93	0.87	.026	1.72	0.84	.040
Duty-related TE							1.00	0.99	.310	0.75	1.03	.465	1.08	0.99	.276
Emotional RSS							-3.05	0.86	<.001	-3.01	0.86	<.001	-0.93	0.96	.332
Duty-related TE X Emo RSS										0.81	0.90	.368	0.40	0.87	.647
Perceived SS													-3.97	0.94	<.001
R (sq)	.08			.11			.17			.18			.24		
F for change in R (sq)	4.99			3.51			7.83			0.81			17.91		
F Change Significance	<.001			.032			<.001			.368			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support; PTSS=posttraumatic stress symptoms; Emo=emotional

Table 5.4.2. Hierarchical regression analysis of received tangible support on PTSS (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.94	2.24	.674	0.80	2.22	.719	1.10	2.20	.618	1.09	2.20	.622	2.04	2.10	.332
Years of Service	1.23	0.95	.194	1.54	0.97	.112	1.38	0.96	.151	1.44	0.97	.138	1.21	0.92	.188
Civil Status (with partner=1)	-9.36	2.20	<.001	-8.57	2.21	<.001	-9.08	2.19	<.001	-9.05	2.19	<.001	-6.73	2.14	.002
Ethnicity (NZ-Euro=1)	-1.21	1.87	.519	-1.39	1.86	.454	-2.98	1.97	.131	-3.01	1.98	.128	-3.18	1.88	.091
Lifetime TE				1.02	0.85	.228	0.58	0.93	.534	0.57	0.93	.538	0.38	0.88	.669
Normative stress				1.89	0.89	.035	1.76	0.88	.045	1.78	0.88	.044	1.67	0.84	.046
Duty-related TE							1.30	0.99	.189	1.18	1.02	.247	1.23	0.97	.205
Tangible RSS							-2.15	0.84	.011	-2.12	0.85	.012	-0.30	0.89	.733
Duty-related TE X Tang RSS										0.46	0.86	.622	0.40	0.82	.625
Perceived SS													-4.34	0.89	<.001
R (sq)	.08			.11			.15			.15			.24		
F for change in R (sq)	4.99			3.51			4.74			0.29			23.99		
F Change Significance	<.001			.032			.010			.622			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support; PTSS=posttraumatic stress symptoms; Tang=tangible

Table 5.4.3. Hierarchical regression analysis of received informational support on PTSS (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.94	2.24	.674	0.80	2.22	.719	1.26	2.23	.572	1.20	2.23	.588	2.09	2.09	.317
Years of Service	1.23	0.95	.194	1.54	0.97	.112	1.52	0.98	.120	1.64	0.99	.096	1.34	0.93	.147
Civil Status (with partner=1)	-9.36	2.20	<.001	-8.57	2.21	<.001	-9.09	2.22	<.001	-9.08	2.22	<.001	-6.58	2.13	.002
Ethnicity (NZ-Euro=1)	-1.21	1.87	.519	-1.39	1.86	.454	-2.74	1.99	.170	-2.74	1.99	.169	-3.08	1.87	.100
Lifetime TE				1.02	0.85	.228	0.42	0.94	.656	0.48	0.94	.606	0.34	0.88	.701
Normative stress				1.89	0.89	.035	1.89	0.89	.034	1.85	0.89	.038	1.64	0.84	.050
Duty-related TE							1.59	1.00	.110	1.30	1.04	.211	1.28	0.98	.190
Informational RSS							-0.87	0.85	.306	-0.78	0.86	.361	0.63	0.84	.458
Duty-related TE X Info RSS										0.97	0.96	.317	0.53	0.91	.562
Perceived SS													-4.63	0.85	<.001
R (sq)	.08			.11			.13			.13			.24		
F for change in R (sq)	4.99			3.51			1.97			1.00			29.71		
F Change Significance	<.001			.032			.142			.317			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support; PTSS=posttraumatic stress symptoms; Info=informational

Moderating effects of received social support

The moderating effects of received social support on PTSS were also tested. Results did not support the idea of received social support, in general, as a stress buffer (see Table 5.2). The different sources and forms of received social support independently also did not buffer the effects of duty-related traumatic exposure on PTSS. The only exception was the interaction between duty-related traumatic exposure and supervisor support (Table 5.3.3). This suggested that high amounts of received social support predicted low levels of PTSS regardless of the level of traumatic exposure. Contrary to predictions based on the classic support-as-a-buffer-of-stressors model, the detrimental (i.e., statistically positive) association between the trauma exposure and PTSS was stronger among the emergency responders who reported higher levels of received support from their supervisors (Fig. 5.1). In other words, under the high trauma exposure conditions, the responders with high levels of supervisor's support reported the highest PCL-5 scores, whereas the emergency workers with low levels of supervisor's support reported the lowest PCL-5 scores. However, the likelihood of observing this moderating effect decreases to $p = .049$ when taking into account the variance explanation of perceived social support.

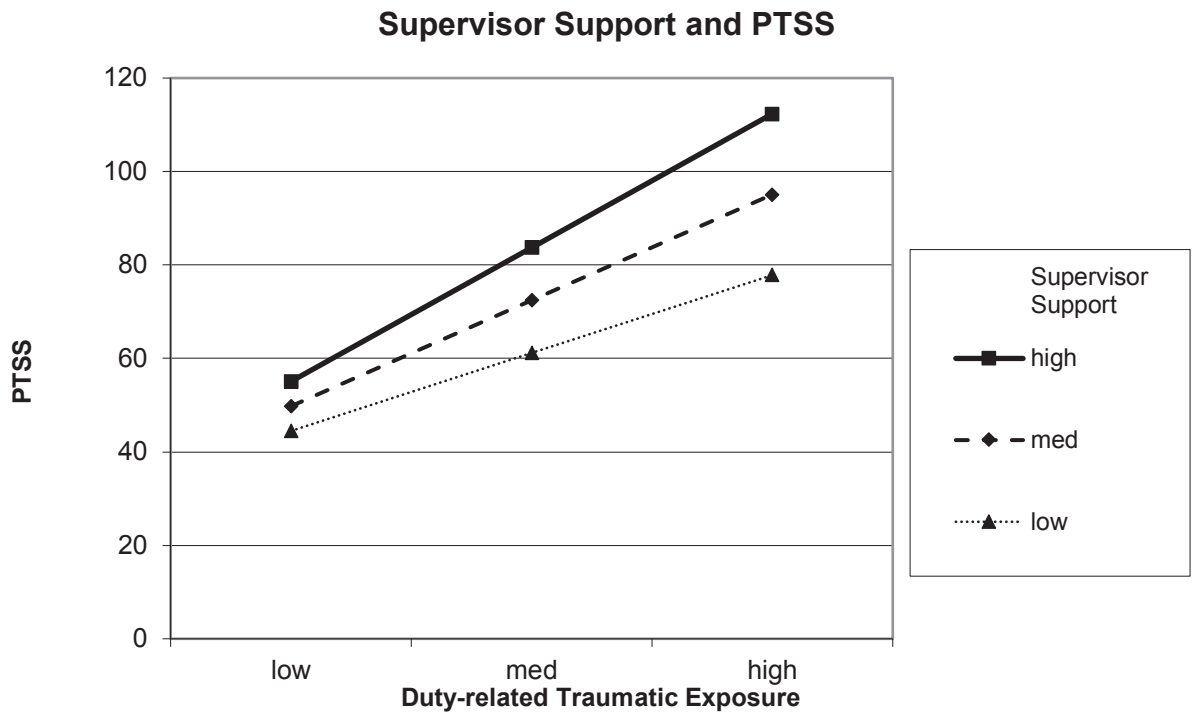

Fig. 5.1. Interaction of duty-related traumatic exposure with received supervisor support: high supervisor support ($B = 8.63, SE\ B = 3.29, t(213) = 2.63, p = .009$); medium supervisor support ($B = 6.83, SE\ B = 2.58, t(213) = 2.65, p = .009$); low supervisor support ($B = 5.02, SE\ B = 1.90, t(213) = 2.64, p = .009$). Unimputed dataset was used for simple slopes analysis.

Discussion

As this study revealed, received social support was associated with lower PTSS. However, once the effects of perceived social support are considered, its effect surpasses that of received social support. This illustrates the strong association of perceived social support on posttraumatic stress symptoms, as shown in Brewin et al.'s (2000) and Ozer et al.'s (2003) meta-analyses. While this may be the case, the potent effect of perceived social support on PTSS may be confounded with other factors, such as personality (DeViva et al., 2016) and attachment styles (O'Connor & Elklit, 2008). For example, individuals with more secure attachment styles are less avoidant of social relationships, which increases their chances of being embedded in a supportive network. Although perception of support may undermine the

receipt of actual support, the experience of receiving support may also alter these misperceptions and irrational beliefs (Hobfoll, 2009), which then may modify the experience of psychological distress and related psychological realities. This presents a strong case for investigations on the elements of received social support that are associated with perceived social support, and with PTSS. As this study shows, with all things being equal, received social support correlates with PTSS.

Mediational models of social support effectiveness suggested that the influence of received social support on emotional/psychological distress is explained through the perceived social support path. As results show, the variance explanation of received social support on PTSS dissolves with the addition of perceived social support. However, received social support is also correlated with perceived social support. These results, in fact, satisfy the classic requirements for mediation (see Baron & Kenny, 1986). Although this paper did not examine the mediating effects of perceived social support, the findings in this study point to the idea that increasing received social support may reduce PTSS by improving one's perception of availability and quality of social support.

Previous work in the area of received social support has outlined mechanisms explaining this phenomenon. Results show that perceived social support explains a larger amount of PTSS variance than received social support—individuals with more positive appraisals of support availability and quality have lower levels of PTSS than those with more negative appraisals of support. This is consistent with the SSDD model (Kaniasty & Norris, 1995b, 2009), which proposed a direct link between perceived support—and an indirect link between received support—and psychological distress. The inability of received social support to predict PTSS when the effect of perceived support is added in the equation further supports this argument.

On the other hand, the SSDD model also suggested that severity of exposure influences mobilisation of support—individuals who have a higher degree of exposure to traumatic events are more likely to receive more support as a function of the need for support. Correlation analyses in the current study, however, showed that high levels of duty-related traumatic exposure is linked with low amounts of received social support. Models explaining the mobilisation and utilisation of social support (e.g., SSDD model, Kaniasty & Norris, 1995, 2009) suggested that individuals with more severe traumatic exposure may receive more social support, as influenced by the need for support (i.e., support mobilisation influenced by relative needs). However, the case may be different for emergency responders. In fact, evidence on the mobilisation of social support as a function of stressor severity in the workplace has been inconsistent (Viswesvaran, Sanchez, & Fisher, 1999). One way of explaining this is in terms of emotional disclosure. For example, Hoyt et al. (2010) found that soldiers and emergency responders, who had higher trauma exposure, were less likely to talk about their experiences than college students. If such is the case, then increase in trauma exposure in emergency responders may result in more inhibition to disclose. It also follows that people who disclose more about their struggles are more likely to receive support than those who do not. Emergency responders may also not wish to share their traumatising experiences, particularly with their family, in order to protect them from possible distress. This runs parallel to the findings of other studies suggesting the lack of inclination of emergency responders to ask for help (e.g., He, Zhao, & Archbold, 2002), influenced by organisational cultures that do not encourage support-seeking (see Crowe, Glass, Lancaster, Raines, & Waggy, 2015; Haugen, McCrillis, Smid, & Nijdam, 2017).

An interesting finding in the study is the exacerbating effect of receiving support from one's supervisor when taking into consideration the level of duty-related traumatic exposure. With duty-related traumatic exposure being equal, high amounts of received supervisor support

predicted the low level of PTSS. However, when the level of traumatic exposure was accounted for, the modifying effect of supervisor support changed. While it is expected that conditions of duty-related traumatic exposure (i.e., being exposed to traumatic events) is associated with high PTSS, receiving more support from supervisors in high exposure conditions was associated with the intensification of this outcome. Although other studies pointed out that perception of support from supervisors may (Stephens & Long, 1999, 2000) or may not (Marchand et al., 2015) alleviate PTSS, the current study illustrates that actual support from supervisors may be detrimental. Future research should look into dimensions of supervisor support and related constructs, such as leadership style.

This finding puts emphasis on the complexity of social support. Kickul and Posig (2001) argued that the reverse buffering effect of supervisor support is usually due to the mismatch between the support needed and the support supervisors provide. Consistent with the findings of Stetz and Bliese (2006), providing supervisory support to emergency responders (e.g., police officers) may, in fact, be more stressful, especially in the case of individuals with low self-efficacy. Although supervisor support, per se, may not lower one's sense of self-efficacy, receiving help from one's supervisor in the context of emergency response may be perceived as lack of competence and may impact the sense of self-efficacy. Low self-efficacy has been consistently associated with high levels of PTSS (Benight & Bandura, 2004; Regehr et al., 2003). In addition, supervisors may be highly sensitive to signs of distress experienced by their subordinates, and may feel the need to provide support even when support is not needed or asked for. When emergency responders receive supervisor support for distress that may not require the attention of the supervisor, this may negatively impact their perception of how serious the distress is and/or their ability to deal with it. Furthermore, receiving support from supervisors could add to the pressure that emergency responders face, as supervisors are often considered as representatives of the organisation

(Rhoades & Eisenberger, 2002). When receiving support becomes associated with negative impact on one's career, loss of social status, or the fear of being judged by supervisors and/or colleagues (Haugen et al., 2017), supervisor support may act as reverse buffer.

That high support from peers is associated with low PTSS scores was not surprising. Together with supervisor support, work-related sources of support have been shown in the literature to be associated with favourable outcomes. For example, work sources of support were found to be more strongly correlated with reduction of exhaustion than non-work sources (Halbesleben, 2006). High amounts of emotional and tangible support were also associated with low PTSS scores, which suggests that receipt of warmth, empathy, validation, and practical forms of support may alleviate these symptoms, consistent with the findings in other studies (Gabert-Quillen et al., 2012). Cutrona and Russell (1990) argued that the form of support received may only be effective if they are optimally matched with the type of stressor. They proposed that emotional support may be effective when facing uncontrollable stressors, while tangible support may be more optimally matched with controllable ones. For emergency responders, being exposed to emergencies both has controllable (e.g., the choice of exposure as a result of choosing the profession) and uncontrollable (e.g., severity of exposure) elements, which may be the reason for emotional and tangible received social support to predict PTSS scores. However, it must be noted that in terms of associations with low PTSS scores, perception of support was still found to be the more potent predictor.

Another notable finding is the negative correlations between years of service and received social support—the longer the years of working in emergency response, the smaller the amount of social support received. This may be due to the increased desensitization of more senior emergency responders to trauma; hence, the lesser need for support. On the other hand, this may also be a function of support seeking and support provision dynamics in

emergency service organisations. More senior emergency responders may be more reluctant to admit they need help (Alexander & Klein, 2001), and would therefore not seek help. However, years of service was found to be negatively correlated with PTSS, so it is also possible that those who have been in the profession for a longer period of time experience lesser distress; hence, require less support. Nevertheless, this is important to address, as support seeking ties in with support provision. Individuals who ask for help are more likely to receive help than those who do not. In addition, the organisational structure may reinforce the reluctance to seek for help. More junior (i.e., those with fewer years of service) emergency responders may experience good camaraderie but as they grow into the organisation, they may find themselves in competition with others for limited growth opportunities, under the watchful eyes of colleague and superiors within a strongly hierarchical structure (Regehr et al., 2003), consequently decreasing support-seeking and support-provision behaviours.

The study is not without limitations. First, the study relied on self-reports; there is a possibility of over, or under, reporting of social support or PTSS. Second, although the study has a good sample size, there are considerably more participants from New Zealand than from the Philippines. Future research should look into more effective ways of enlisting emergency responders in the Philippines to participate in studies like this. Third, the study's cross-sectional design prevents it from making causal inferences. Fourth, the manner in which the survey was conducted made it impossible to calculate the response rate. This is an inherent problem in the conduct of web-based surveys (Fan & Yan, 2010), which impacts the extent to which results may be generalised. The results of the study should also be interpreted with this limitation in mind.

This research has several strengths. This is one of the few studies in this area which used the DSM-5 criteria for posttraumatic stress disorder. It also teased apart the different elements of received social support, which is usually neglected in the literature. Exploring the effects of the different facets and forms of received social support is arguably important for intervention. Knowing what form of social support works, and from whom, is informative in terms of designing programs for emergency responders that harness social support resources. Although results of the study confirmed the superior modification effects of perceived social support on PTSS, received social support may also modify one's perception of support. This study furthers the conversation on how received social support influences perceived social support, and eventually, psychological outcomes. Overall, this article underscores the importance of avoiding a one-size-fits-all approach when providing support.

The results strengthen the position that more research needs to be conducted on received social support. Findings in the current study show that although received social support predicted PTSS scores, the amount of variance explained is rather small. However, received social support may be more effective in modifying other psychological outcomes. These findings suggest that are the territories that are beyond the effective reach of this social support facet. Intervention elements, such as social support, have their strengths as well as limitations, and it is equally important to demarcate what these elements can and cannot do.

This study shows that received social support did not predict PTSS level once perceived support is factored in. On the other hand, received support may indirectly influence psychological outcomes, through perceived social support. It is, therefore, worthwhile to study the mediating variables that bridge received and perceived social support. Whereas the positive effect of perceived social support has been consistently documented as beneficial to health outcomes, the effectiveness of received social support has been shown to be influenced

by several factors. Cutrona and Russell (1990), for example, suggested that receiving social support may result in positive outcomes only when the support received matches the support needed. Uchino et al. (2011) added that the relationship quality between the support provider and recipient also influences how received support modifies health outcomes. It would be interesting to test whether these received social support factors also influence the perception of support.

The findings of the study generally support the main effects model of social support. These results highlight a very important point: received social support is effective but its effectiveness has limitations. When considering a wide array of factors, its effectiveness is easily overshadowed. With all things being equal, receiving support from some sources of support may reduce PTSS, but in some conditions, this may also intensify the effect of traumatic exposure. Although high amounts of received social support from most sources and forms are associated with low levels of PTSS, supervisor support may have the opposite effect in high trauma conditions. Ethnicity was also correlated with received social support, but not in PTSS. This suggests that although there are differences in the amount of support to emergency responders depending on geographic and ethnic backgrounds, the posttraumatic psychological effect of emergency response work—and the necessity to provide effective support—to these groups of professionals is universal.

Chapter Six: Social adjustment in New Zealand and Philippine emergency responders: A test of main and moderating effects

Abstract

This article examines the influence of received social support on the social adjustment of emergency responders, with the growing recognition of the importance of social adjustment in relation to health. Emergency responders ($n = 223$) from New Zealand and the Philippines answered an online questionnaire measuring demographic variables, social support, and social adjustment, with data analysed using hierarchical regression analyses. Results show received supervisor support ($B = -1.17, p = .011$) and received emotional support ($B = -1.51, p = .002$) explain the variance in social and occupational impairment independent of perceived social support effects. On the other hand, high amounts of family ($B = 0.22, p = .036$), supervisor ($B = 0.31, p = .048$), and all forms of received social support were associated with high posttraumatic relationship growth scores. However, no interaction effects were found. Findings of the study support the main effects model and underscore the differential effects of the various components of received social support on social adjustment dimensions.

Introduction

The psychological effects of being exposed to emergencies are widely documented in the literature, with consequences ranging from mild to severe psychological distress (Bonanno et al., 2010; Norris et al., 2002; Rubonis & Bickman, 1991). These effects are observed both at the interpersonal (e.g., changes in social relationships) and intrapersonal (e.g., effects on mood and anxiety) levels. An interpersonal dimension which is potentially influenced by exposure to emergencies is social health, characterized by how well a person independently

manages his/her life and performs social and occupational functions and obligations (Larson, 1993)—an evaluation of an individual's social circumstance and social functioning (Keyes, 1998). Performance of these roles and functions may be disrupted by critical incidents. Fritz (1961) declared that disasters disturb the "social context within which individuals and groups function" (p. 651). Indeed, later research has shown that exposure to disasters and emergencies may lead to disorientation, displacement, and disruption of routines (e.g., Cox & Perry, 2011). For example, disasters may force businesses to close, which in effect, may disrupt people's occupational functioning (e.g., they stop working or are forced to look for another job). In a non-disaster emergency context, experiencing a vehicular accident may leave the person traumatised—he/she may avoid taking public transport, consequently affecting his/her job and social relationships (e.g., avoiding contact with others).

Disasters and emergencies are events that most people do not experience on a daily basis. When these events occur, they significantly impact social relationships (Kaniasty, 2012) and social and occupational functioning (Stellman et al., 2008). However, there are individuals who face disasters and emergencies as part of routine. This raises the question: does routine exposure to these critical incidents result in the same form or level of disruption? For some individuals, such as the police, firefighters, and ambulance workers, exposure to emergencies is something they deal with on a regular basis. This article explores the changes in social relationships and social and occupational functioning of emergency responders—professionals who are tasked to protect and preserve life, property, and the environment (Prati & Pietrantoni, 2010b) in the aftermath of these unfortunate events.

In the field of post-emergency intervention, there is the growing recognition of the importance of addressing "social health" (van Ommeren, Saxena, & Saraceno, 2005), a term which collectively refers to social relationships and social and occupational functioning.

Social health has two dimensions: social adjustment and (perceived) social support. Social adjustment is defined as the satisfaction with relationships and performance of social roles (Larson, 1993). This definition has three facets: satisfaction with relationships, performance in social roles, and adjustment to the environment. Social support, in this conceptualisation, refers to the availability of caring individuals whom one can trust and rely on (Larson, 1993).

Social adjustment

There are different conceptualisations of social adjustment, but these different ways of defining the construct have two salient elements: performance of social functions and satisfaction with social relationships (see Larson, 1993). In the context of emergency response work, social adjustment may be conceived as the satisfaction with social relationships and performance of social and occupational roles and obligations amidst constant exposure to traumatic events. Clinically, this translates to the absence of social and occupational impairment. Although social adjustment, in relation to social health, is often formulated as a predictor of psychological health, some researchers (e.g., Alvarez & Hunt, 2005) suggest that psychological health may, in fact, influence social adjustment. For instance, deployment in disasters may cause psychological distress that could disrupt intimate relationships. Disaster exposure has also been documented to result in the erosion of community cohesion and interpersonal relationships (e.g., Kaniasty, 2012). Close relationships are also observed to breakdown as a result of traumatic exposure, as in posttraumatic stress disorder (e.g., Pyszczynski & Kesebir, 2011; Shallcross, Arbisi, Polusny, Kramer, & Erbes, 2016). On the other hand, although less frequently observed, exposure to emergencies and disasters may also result in improvement in social relationships (Bonanno et al., 2010). However, literature on social adjustment in emergency responders is sparse. As

the importance of social adjustment vis-à-vis social health becomes increasingly recognised, the need to explore the construct further becomes more compelling.

Social support

Social support is comprised of social interactions that provide actual assistance and embed people in a network of social relationships that are perceived to be loving and caring (Hobfoll & Stokes, 1988). This definition highlights three important facets (Kaniasty & Norris, 2009): the provision and receipt of actual support (received social support), the evaluation of availability and quality of support (perceived social support), and the structural integration in a supportive network (social embeddedness). Larson (1993) defined social support as the number of people within one's social network and the satisfaction with this social network. This definition only covers perceived social support and social embeddedness, and leaves out received social support. The current study focusses on received social support.

Received social support and social adjustment

Received social support is a crucial social support facet in the context of disasters and emergencies. In the aftermath of these events, people normally and spontaneously mobilise the provision of actual support (Kaniasty & Norris, 1995a). However, as Kaniasty and Norris pointed out, the provision and access to actual support was not equal among the affected individuals, with some sociodemographic groups (e.g., in terms of age or ethnicity) receiving more support than others. Having said that, the effectiveness of social support has been enigmatic. While studies have consistently linked perceived social support with favourable health outcomes, the same cannot be said of received social support (Thoits, 2011). Several researchers have attempted to explain this phenomenon, suggesting that effective received support is that which is optimally matched with the requirements of the stressor (Cutrona &

Russell, 1990), or that which matches the quantity or quality desired by the recipient (Rini & Dunkel Schetter, 2010).

In addition, there are two major theoretical models explaining the influence of social support on psychological outcomes. Social support has originally been viewed as a stress-buffer (Cohen & Wills, 1985)—it is only useful when one is under a stressful condition. For example, people in high-risk occupations, such as the military and fire service, with low social support were particularly vulnerable to posttraumatic stress disorder, and that having social support dampened posttraumatic psychological reactions (e.g., de Terte & Stephens, 2014; Kaspersen et al., 2003; Schwarzer et al., 2014). This suggests that having high levels of social support buffers the negative effects of duty-related traumatic exposure. Similarly, paramedics with low level of support experienced more sleep disturbance in conditions of high occupational stress than those with high level of support in the same conditions (Pow, King, Stephenson, & DeLongis, 2017). As no difference in sleep disturbance was found in low occupational stress conditions, social support, in this case, buffered the negative effects of occupational stress. On the other hand, buffering effects were not always observed; a good amount of evidence suggests social support directly influences psychological outcomes regardless of stress level (Cohen et al., 2000; Kawachi & Berkman, 2001; La Rocco & Jones, 1978). Yet another effect of social support has also been documented: social support may also enhance or exacerbate (reverse buffer) psychological outcomes when considering the intensity or severity of stress condition (see Guilaran et al., 2018; Kickul & Posig, 2001). There is also evidence suggesting that social support may magnify the effects of traumatic exposure on psychological outcomes (Kickul & Posig, 2001).

Notwithstanding these variations in conceptualising its effectiveness, social support has been found to be one of the more reliable factors that contribute to positive psychological and

social outcomes in the context of disasters and mass emergencies (Hobfoll et al., 2007). While it makes sense that socially well-adjusted individuals have healthier social relationships and therefore, have better access to social support, there is also evidence pointing to social support influencing social adjustment. For example, organisational support is found to be linked with work-family life balance and less work-family life conflict (Kurtessis et al., 2017). Furthermore, sources of support have been found to have differential effects: broad sources of social support (e.g., organisations) were found to have more significant contributions to work-family conflict than specific sources (French, Dumani, Allen, & Shockley, 2018). Exposure to emergencies and disasters adds another layer of complexity to these variable relationships. It is then worth exploring the facets, forms, and sources of received social support that influence the social adjustment of individuals who regularly face these types of critical incidents.

Methods

Participants

The study involved 223 emergency responders based in New Zealand (n=195) and in the Philippines (n=28) who were affiliated with an emergency response organisation. Mean age was 43.19 years (SD=12.12). Most of the participants identified as males (n=171) and as New Zealanders of European ethnicity (n=152). Twenty-nine identified as Asians, 22 as New Zealanders of mixed or Maori ethnicities, and the remaining participants identified as people from Australia and Oceania (n=8), and from Europe and North America (n=14). The majority were affiliated with the fire service (n=157), followed by those working in the medical services, 13 in emergency/disaster management organisations, 10 in the police force, and 7 in other emergency response groups.

Procedure

Recruitment and data collection for this cross-sectional study were conducted for 7 months, beginning 1 May 2017. Participant recruitment was primarily done through social media. Information about the study was also disseminated through communications within different emergency response organisations. Participation entailed answering a web-based survey, but a paper-and-pencil option was also made available. The scales used in this study were part of a research questionnaire measuring flourishing, perceived social support, traumatic exposure, PTSS, psychological distress, work and social impairment, received social support, support effectiveness, support consequence, normative stress, posttraumatic relationship growth, and religious activities.

Measures

Exposure to traumatic event

The study captured duty-related traumatic exposure using the Life Events Checklist for DSM-5 (LEC-5). (Weathers, Blake, et al., 2013). The measure lists traumatic events (16 specific events and one open-response item). For the purpose of the study, the standard scale was modified. Participants indicated, in sequence, the events that they have been exposed to (1) in their lifetime (LEC-5 lifetime), and (2) in their work as emergency responders (LEC-5 duty-related), with the latter being the main predictor. Being a DSM-5 version, LEC-5 is yet to be thoroughly psychometrically evaluated. However, its previous version, which does not significantly depart from the current one, was reported to have an average kappa reliability coefficient of .61 and a test-retest reliability coefficient of .82 (Gray et al., 2004).

Social adjustment

Two scales were used to measure social adjustment. The five-item Work and Social Adjustment Scale (WSAS) was used to measure social and occupational impairment and

functioning (see Mundt, Marks, Shear, & Greist, 2002); a higher score suggested more severe impairment. For this study, the items were anchored on "experiences at work" (e.g., "Because of my experiences at work, my ability to work is impaired."). The items were answered using a nine-point scale, ranging from 0 (no impairment) to 8 (very severe impairment). For the current study, it had the Cronbach's alpha of .88.

The WSAS was used to measure social and occupational impairment, as an indicator of social adjustment deficit. On the other hand, the presence of positive social adjustment was measured using the Posttraumatic Growth Inventory (PTGI). The PTGI (Tedeschi & Calhoun, 1996) was used to measure posttraumatic relationship growth, which are the positive changes in social relationships after traumatic exposure. For this study, only the seven items in the Relating to Others factor were used. The scale can be answered using a six-point scale, according to the degree to which the changes specified in the item are attributed to their work as emergency responders. For this study, the scale had a Cronbach's alpha of .91.

Received social support

Received social support was measured using the 14-item Berlin Social Support Scale (BSSS) Recipient Version (Schwarzer & Schulz, 2000). The scale was modified in this study to reflect a frequency response continuum (i.e., never =1, rarely =2, sometimes=3, often=4, and always=5) in lieu of the original agreement-disagreement continuum. A qualifier (i.e., abandonment) was also added to Item 3 ("This person left me alone.") to ensure that participants understood it correctly. This scale provided a score for global received social support, as well as family, peer, and supervisor received social support scores (i.e. received support sources). Received social support forms (i.e., emotional, 9 items; informational, 2 items; tangible, 3 items) were also derived. Global received social support was measured by averaging the scores from all three sources. The current study found the full 14-item scale to

have a Cronbach's alpha of .95. Cronbach's alphas for the sources were as follows: family, .94; peer, .92; and, supervisor, .94. Emotional support had a Cronbach's alpha of .92, tangible support, .84; and, informational support, .79.

Perceived social support

The main effects of received social support were controlled for the variance explanation of perceived social support. This construct was measured using the Interpersonal Support Evaluation List (ISEL-12, S. Cohen, Mermelstein, Karmarck, & Hoberman, 1985). This scale measures the perception of availability of support through a four-point response format (i.e., definitely false=1 to definitely true=4). Cronbach's alpha for the current study is .88.

Statistical Control Variables

To isolate the variance contribution of LEC-5 (duty-related) and received social support on the outcome variables, analyses of main effects were controlled for gender, years of service, civil status (with or without a partner), and ethnicity. Year of first entry to the profession was used as a proxy measure for the length of service in the emergency response sector. Gender, civil status, and ethnicity were dummy coded. Participant ethnicity was coded "1" for those who identified as New Zealander of European decent and "0" for those who identified otherwise. Analyses of main effects also controlled for lifetime exposure to traumatic events, specifically external to their role as emergency responders.

The main effects were also controlled for experience of normative stressful events (e.g., moving/changing residence, break up with a close friend) in the past 12 months using the Life Events List (LEL, Cohen, Tyrrell, & Smith, 1991; Common Cold Project, n.d.). This scale was modified for the study, by excluding the probe questions that are found in the original scale.

Statistical analyses

The main effects of received social support on social adjustment variables were tested using hierarchical regression analyses. Block 1 included gender, age, civil status, and ethnicity. Block 2 contained LEC-5 (lifetime) and LEL. These measures were used to isolate the effects of LEC-5 (duty-related) independent of non-duty-related stressors. LEC-5 (duty-related) and Berlin Social Support scale(s) were entered in Block 3, and the interaction between the two were entered in Block 4. Finally, ISEL-12 was entered in Block 5, to test for the variance explanation of received social support with the addition of perceived social support in the model. All statistical analyses were performed using SPSS version 25. No outliers were found in the analyses, where casewise deletion (3 SDs) was implemented. Regression analyses were also checked for multicollinearity using Tolerance and Variance Inflation Factors; no significant overlaps in variance explanation among predictors were found.

Treatment of missing data

Analysis of the missing data was performed by running missing values analysis (MVA). Missing data pattern was tested using Little's MCAR Chi-square through 400 iterations of the expectation-maximization (EM) algorithms, where no significant pattern was found. Missing data were treated using the multiple imputation-Markov chain Monte Carlo (MI-MCMC). To ensure the preservation of statistical power, five imputations were generated (Graham et al., 2007). Imputation was performed at the scale level, with only cases with at least 95% completion rate were included in the dataset.

Results

Correlations

Zero-order correlations between social adjustment variable and demographic, predictor, and moderator variables, as well as means and standard deviations, are shown in Table 6.1. Received social support variables were positively correlated with posttraumatic relationship growth, and except for informational support, were negatively correlated with social and occupational impairment. High perceived social support was associated with low social and occupational impairment and with high posttraumatic relationship growth. Being male, older, having a partner, and being a New Zealander of European ethnicity were associated with low posttraumatic relationship growth scores. On the other hand, age and having a partner were negatively correlated with impairment in social and occupational functioning. High duty-related traumatic exposure was correlated with posttraumatic relationship growth ($r = -.28, p < .001$) but not with social and occupational impairment.

Table 6.1. Correlation matrix

	n	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Gender (M=1, F=2)	219	1.22	0.41																
2. Years of Service	222	18.11	13.45	-.34***															
3. Civil status (w/ partner=1)	223	1.79	0.41	-.28***	.29***														
4. Ethnicity (NZ-Euro=1)	223	0.68	0.47	-.15*	.25***	.001													
5. Lifetime TE	223	5.50	3.14	-.02	.11	.02	.01												
6. Normative Stress	223	4.65	3.15	.14*	-.28***	-.24***	-.01	.14*											
7. Duty-related TE	223	7.58	3.32	-.18**	.13	.14*	.35***	.40***	.03										
8. Global RSS	222	3.30	0.68	.12	-.22**	-.07	-.21**	-.003	.04	-.22**									
9. Family RSS	221	3.53	0.89	.13	-.20**	.01	-.19**	-.03	.003	-.21**	.74***								
10. Peer RSS	220	3.29	0.78	.08	-.04	-.10	-.16*	-.04	.02	-.16*	.82***	.36***							
11. Supervisor RSS	219	3.08	0.89	.11	-.22**	-.12	-.17*	.04	.11	-.16*	.84***	.38***	.63***						
12. Emotional RSS	223	3.50	0.68	.15*	-.22*	-.08	-.23**	-.01	.06	-.25***	.97***	.72***	.80***	.82***					
13. Tangible RSS	223	3.06	0.79	.05	-.14*	-.04	-.16*	.01	-.01	-.18**	.89***	.68***	.71***	.74***	.80***				
14. Informational RSS	223	2.76	0.87	.09	-.20*	-.07	-.13	.01	.06	-.12	.83***	.62***	.65***	.71***	.73***	.71***			
15. Perceived SS	223	3.15	0.53	.07	-.08	.17*	-.11	-.04	-.06	-.08	.49***	.41***	.47***	.32***	.52***	.42***	.32***		
16. SOI	222	5.51	6.64	.07	-.03	-.24***	.07	-.02	.12	.12	-.30***	-.19**	-.22**	-.27***	-.34***	-.23***	-.11	-.39***	
17. PTRG	220	2.60	1.30	.14*	-.18**	-.18**	-.23**	-.09	.10	-.28***	.51***	.33***	.51***	.40***	.46***	.45***	.48***	.26***	-.02

*p<.05, **p<.01, ***p<.001; correlations were calculated using imputed dataset; TE=traumatic exposure; RSS=received social support; SS=social support; SOI=social and occupational impairment; PTRG=posttraumatic relationship growth

Effects of received social support on social and occupational impairment

Hierarchical regression analysis (Table 6.2) showed main effects of global received social support on social and occupational impairment, when controlled for the effects of the demographic variables and traumatic exposure. This effect remained even with the addition of perceived social support in the model. This suggests that independent of the influence of perceived social support, receiving actual support was linked with low levels of impairment in work and social domains of functioning. Hierarchical regression analyses on the different sources of received social support (Table 6.3.1 to 6.3.3) revealed that work-related sources (i.e., peer and supervisor) of social support predicted the level of social and occupational impairment; higher amounts of received support from these sources were associated with better social and occupational functioning. However, when the effect of perceived social support was considered, only supervisor received support predicted social and occupational impairment. Analyses of the variance explanation of the different forms of received support showed that high amounts of emotional (Table 6.4.1) and tangible (Table 6.4.2) supports were associated with fewer impairment symptoms. On the other hand, informational support (Table 6.4.3) did not predict social and occupational impairment. When perceived social support was added in the models, only received emotional support remained to have an effect on social and occupational impairment. Although received social support was found to directly influence social and occupational functioning, results did not support the idea of received social support buffering the effects work-related traumatic exposure on impairment in social and occupational.

Table 6.2. Hierarchical regression analysis of global received social support on social and occupation impairment (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.49	1.14	.668	0.49	1.15	.671	0.91	1.09	.402	0.91	1.09	.406	1.21	1.06	.256
Years of Service	0.21	0.49	.663	0.37	0.51	.470	0.11	0.49	.827	0.14	0.49	.784	0.08	0.48	.865
Civil Status (with partner=1)	-3.87	1.14	.001	-3.66	1.16	.002	-4.03	1.10	<.001	-4.03	1.11	<.001	-3.06	1.10	.005
Ethnicity (NZ-Euro=1)	0.91	0.97	.347	0.84	0.97	.389	-0.56	1.00	.576	-0.60	1.00	.553	-0.56	0.97	.566
Lifetime TE				-0.21	0.45	.637	-0.56	0.47	.235	-0.55	0.47	.242	-0.64	0.45	.162
Normative stress				0.53	0.47	.256	0.51	0.44	.248	0.52	0.44	.241	0.44	0.43	.309
Duty-related TE							0.95	0.50	.060	0.88	0.53	.093	0.97	0.51	.056
Global RSS							-1.96	0.43	<.001	-1.95	0.44	<.001	-1.05	0.48	.029
Duty-related TE X Global RSS										0.21	0.46	.649	0.06	0.45	.902
Perceived SS													-1.83	0.48	<.001
R (sq)	.06			.07			.17			.17			.23		
F for change in R (sq)	3.62			0.69			13.67			0.22			14.95		
F Change Significance	.007			.503			<.001			.649			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support

Table 6.3.1. Hierarchical regression analysis of received family support on social and occupation impairment (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.49	1.14	.668	0.49	1.15	.671	0.93	1.13	.410	0.92	1.14	.419	1.25	1.07	.246
Years of Service	0.21	0.49	.663	0.37	0.51	.470	0.32	0.51	.525	0.33	0.51	.523	0.19	0.48	.693
Civil Status (with partner=1)	-3.87	1.14	.001	-3.66	1.16	.002	-3.90	1.15	.001	-3.85	1.16	.001	-2.74	1.11	.014
Ethnicity (NZ-Euro=1)	0.91	0.97	.347	0.84	0.97	.389	-0.31	1.04	.764	-0.39	1.06	.714	-0.50	1.00	.617
Lifetime TE				-0.21	0.45	.637	-0.71	0.49	.144	-0.72	0.49	.140	-0.74	0.46	.107
Normative stress				0.53	0.47	.256	0.52	0.46	.257	0.52	0.46	.265	0.42	0.44	.338
Duty-related TE							1.23	0.54	.023	1.19	0.55	.032	1.08	0.50	.030
Family RSS							-0.74	0.57	.221	-0.75	0.58	.221	-0.17	0.39	.657
Duty-related TE X Fam RSS										0.18	0.46	.696	0.21	0.43	.621
Perceived SS													-2.29	0.44	<.001
R (sq)	.06			.07			.11			.11			.21		
F for change in R (sq)	3.62			0.69			5.17			0.17			27.31		
F Change Significance	.007			.503			.006			.696			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support; Fam=family

Table 6.3.2. Hierarchical regression analysis of received peer support on social and occupation impairment (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.49	1.14	.668	0.49	1.15	.671	0.78	1.13	.486	0.78	1.13	.487	1.22	1.08	.258
Years of Service	0.21	0.49	.663	0.37	0.51	.470	0.41	0.50	.411	0.40	0.50	.419	0.19	0.48	.691
Civil Status (with partner=1)	-3.87	1.14	.001	-3.66	1.16	.002	-4.12	1.13	.000	-4.12	1.13	<.001	-2.93	1.11	.008
Ethnicity (NZ-Euro=1)	0.91	0.97	.347	0.84	0.97	.389	-0.16	1.02	.874	-0.16	1.02	.877	-0.33	0.97	.732
Lifetime TE				-0.21	0.45	.637	-0.57	0.48	.232	-0.57	0.48	.236	-0.70	0.46	.131
Normative stress				0.53	0.47	.256	0.44	0.45	.334	0.44	0.46	.340	0.37	0.44	.391
Duty-related TE							0.97	0.52	.060	0.97	0.53	.065	1.08	0.50	.032
Peer RSS							-1.24	0.51	.027	-1.24	0.52	.029	-0.52	0.44	.239
Duty-related TE X Peer RSS										-0.01	0.43	.974	-0.21	0.41	.612
Perceived SS													-2.11	0.47	<.001
R (sq)	.06			.07			.14			.14			.22		
F for change in R (sq)	3.62			0.69			9.11			0.06			22.01		
F Change Significance	.007			.503			<.001			.974			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support

Table 6.3.3. Hierarchical regression analysis of received supervisor support on social and occupation impairment (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.49	1.14	.668	0.49	1.15	.671	0.77	1.10	.482	0.84	1.10	.445	1.18	1.06	.264
Years of Service	0.21	0.49	.663	0.37	0.51	.470	0.16	0.49	.749	0.25	0.50	.626	0.10	0.48	.842
Civil Status (with partner=1)	-3.87	1.14	.001	-3.66	1.16	.002	-4.23	1.11	<.001	-4.28	1.11	<.001	-3.16	1.10	.004
Ethnicity (NZ-Euro=1)	0.91	0.97	.347	0.84	0.97	.389	-0.45	1.01	.658	-0.40	1.02	.697	-0.51	0.97	.596
Lifetime TE				-0.21	0.45	.637	-0.56	0.47	.240	-0.55	0.47	.247	-0.61	0.45	.175
Normative stress				0.53	0.47	.256	0.61	0.45	.170	0.63	0.45	.158	0.50	0.43	.240
Duty-related TE							1.05	0.52	.043	0.92	0.54	.086	0.94	0.50	.061
Supervisor RSS							-1.77	0.47	<.001	-1.77	0.47	<.001	-1.17	0.46	.011
Duty-related TE X Sup RSS										0.46	0.43	.290	0.23	0.42	.581
Perceived SS													-1.94	0.44	<.001
R (sq)	.06			.07			.16			.17			.24		
F for change in R (sq)	3.62			0.69			12.33			1.19			19.76		
F Change Significance	.007			.503			<.001			.290			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support; Sup=supervisor

Table 6.4.1. Hierarchical regression analysis of received emotional support on social and occupation impairment (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.49	1.14	.668	0.49	1.15	.671	1.07	1.07	.320	1.06	1.07	.323	1.27	1.05	.228
Years of Service	0.21	0.49	.663	0.37	0.51	.470	0.06	0.48	.893	0.11	0.48	.818	0.06	0.47	.900
Civil Status (with partner=1)	-3.87	1.14	.001	-3.66	1.16	.002	-3.97	1.08	<.001	-3.96	1.08	<.001	-3.15	1.09	.004
Ethnicity (NZ-Euro=1)	0.91	0.97	.347	0.84	0.97	.389	-0.63	0.98	.519	-0.70	0.98	.476	-0.65	0.96	.499
Lifetime TE				-0.21	0.45	.637	-0.50	0.46	.278	-0.48	0.46	.294	-0.57	0.45	.203
Normative stress				0.53	0.47	.256	0.53	0.43	.224	0.55	0.44	.207	0.47	0.43	.274
Duty-related TE							0.77	0.50	.119	0.67	0.52	.194	0.80	0.51	.114
Emotional RSS							-2.35	0.43	<.001	-2.33	0.43	<.001	-1.51	0.49	.002
Duty-related TE X Emo RSS										0.33	0.45	.465	0.17	0.44	.707
Perceived SS													-1.57	0.48	.001
R (sq)	.06			.07			.21			.21			.25		
F for change in R (sq)	3.62			0.69			18.42			0.54			10.80		
F Change Significance	.007			.503			<.001			.465			.001		

TE=traumatic exposure; RSS=received social support; SS=social support; Emo=emotional

Table 6.4.2. Hierarchical regression analysis of received tangible support on social and occupation impairment (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.49	1.14	.668	0.49	1.15	.671	0.74	1.12	.506	0.74	1.12	.506	1.19	1.07	.269
Years of Service	0.21	0.49	.663	0.37	0.51	.470	0.28	0.50	.577	0.26	0.50	.602	0.15	0.48	.760
Civil Status (with partner=1)	-3.87	1.14	.001	-3.66	1.16	.002	-4.05	1.13	<.001	-4.06	1.13	<.001	-2.93	1.11	.008
Ethnicity (NZ-Euro=1)	0.91	0.97	.347	0.84	0.97	.389	-0.35	1.02	.734	-0.34	1.02	.741	-0.42	0.97	.669
Lifetime TE				-0.21	0.45	.637	-0.58	0.48	.224	-0.58	0.48	.226	-0.68	0.46	.140
Normative stress				0.53	0.47	.256	0.45	0.45	.317	0.45	0.45	.323	0.40	0.43	.357
Duty-related TE							1.05	0.51	.041	1.08	0.53	.040	1.10	0.50	.028
Tangible RSS							-1.41	0.44	.001	-1.42	0.44	.001	-0.53	0.46	.244
Duty-related TE X Tang RSS										-0.13	0.44	.777	-0.16	0.42	.713
Perceived SS													-2.12	0.46	<.001
R (sq)	.06			.07			.14			.14			.22		
F for change in R (sq)	3.62			0.69			8.59			0.28			21.40		
F Change Significance	.007			.503			<.001			.777			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support; Tang=tangible

Table 6.4.3. Hierarchical regression analysis of received informational support on social and occupation impairment (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.49	1.14	.668	0.49	1.15	.671	0.84	1.14	.459	0.83	1.14	.466	1.26	1.07	.243
Years of Service	0.21	0.49	.663	0.37	0.51	.470	0.35	0.51	.495	0.37	0.51	.464	0.22	0.48	.648
Civil Status (with partner=1)	-3.87	1.14	.001	-3.66	1.16	.002	-4.06	1.15	<.001	-4.06	1.15	<.001	-2.80	1.11	.012
Ethnicity (NZ-Euro=1)	0.91	0.97	.347	0.84	0.97	.389	-0.20	1.03	.848	-0.20	1.04	.848	-0.37	0.98	.705
Lifetime TE				-0.21	0.45	.637	-0.68	0.49	.163	-0.66	0.49	.175	-0.74	0.46	.110
Normative stress				0.53	0.47	.256	0.54	0.46	.244	0.53	0.46	.255	0.42	0.44	.331
Duty-related TE							1.23	0.52	.018	1.16	0.54	.032	1.14	0.51	.025
Informational RSS							-0.69	0.44	.119	-0.67	0.45	.134	0.05	0.44	.912
Duty-related TE X Info RSS										0.23	0.50	.642	0.01	0.47	.982
Perceived SS													-2.36	0.44	<.001
R (sq)	.06			.07			.11			.11			.22		
F for change in R (sq)	3.62			0.69			4.40			0.22			28.40		
F Change Significance	.007			.503			.013			.642			<.001		

TE=traumatic exposure; RSS=received social support; SS=social support; Info=informational

Effects of received social support on posttraumatic relationship growth

High levels of global received social support were positively associated with posttraumatic relationship growth even when factoring in the effects of the demographic variables, traumatic exposure, and perceived social support (Table 6.5). Unlike the observations in social and occupational impairment, perceived social support did not predict posttraumatic relationship growth in relation to the effects of global received support. Tests of the effects of the different sources of received support showed high amount of family (Table 6.6.1) and supervisor support (Table 6.6.3) to be associated with improvement in social relationships after traumatic exposure. These effects remained even with the addition of perceived social support in the models. On the other hand, received peer support (Table 6.6.2) was not found to assist posttraumatic relationship growth. All three forms (i.e., emotional, tangible, and informational) of received social support (Table 6.7.1 to 6.7.3) were found to directly positively influence posttraumatic relationship growth. Furthermore, perceived social support was not found to predict posttraumatic relationship growth when the effects of emotional received support or tangible received support were tested. Similar to the results on social and occupational functioning, received social support did not interact with duty-related traumatic experience to influence the level of posttraumatic relationship growth.

Table 6.5. Hierarchical regression analysis of global received social support on posttraumatic relationship growth (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.14	0.23	.545	0.14	0.23	.534	0.05	0.20	.816	0.05	0.20	.806	0.04	0.20	.852
Years of Service	-0.09	0.09	.338	-0.06	0.10	.555	0.03	0.09	.722	0.02	0.09	.860	0.02	0.09	.841
Civil Status (with partner=1)	-0.46	0.22	.036	-0.44	0.22	.051	-0.36	0.20	.066	-0.37	0.20	.063	-0.40	0.20	.047
Ethnicity (NZ-Euro=1)	-0.57	0.19	.002	-0.59	0.19	.002	-0.27	0.18	.133	-0.25	0.18	.164	-0.25	0.18	.162
Lifetime TE				-0.12	0.09	.172	-0.07	0.08	.430	-0.07	0.08	.406	-0.07	0.08	.430
Normative stress				0.07	0.09	.406	0.08	0.08	.307	0.08	0.08	.336	0.08	0.08	.318
Duty-related TE							-0.15	0.09	.097	-0.12	0.10	.220	-0.12	0.10	.206
Global RSS							0.59	0.08	<.001	0.58	0.08	<.001	0.55	0.09	<.001
Duty-related TE X Global RSS										-0.11	0.08	.173	-0.11	0.08	.199
Perceived SS													0.07	0.09	.420
R (sq)	.09			.10			.32			.32			.32		
F for change in R (sq)	5.56			1.12			33.61			1.97			0.67		
F Change Significance	<.001			.328			<.001			.173			.420		

TE=traumatic exposure; RSS=received social support; SS=social support

Table 6.6.1. Hierarchical regression analysis of received family support on posttraumatic relationship growth (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.14	0.23	.545	0.14	0.23	.534	0.03	0.22	.886	0.04	0.22	.849	0.00	0.21	.989
Years of Service	-0.09	0.09	.338	-0.06	0.10	.555	-0.02	0.09	.848	-0.02	0.09	.837	0.00	0.09	.972
Civil Status (with partner=1)	-0.46	0.22	.036	-0.44	0.22	.051	-0.41	0.22	.058	-0.44	0.22	.045	-0.57	0.22	.008
Ethnicity (NZ-Euro=1)	-0.57	0.19	.002	-0.59	0.19	.002	-0.32	0.19	.103	-0.27	0.20	.170	-0.26	0.19	.181
Lifetime TE				-0.12	0.09	.172	-0.01	0.10	.878	-0.01	0.10	.918	-0.01	0.09	.934
Normative stress				0.07	0.09	.406	0.08	0.09	.380	0.08	0.09	.355	0.09	0.08	.277
Duty-related TE							-0.24	0.12	.042	-0.22	0.12	.075	-0.21	0.11	.065
Family RSS							0.28	0.12	.038	0.29	0.12	.043	0.22	0.10	.036
Duty-related TE X Fam RSS										-0.11	0.09	.223	-0.11	0.09	.195
Perceived SS													0.27	0.09	.002
R (sq)	.09			.10			.20			.20			.24		
F for change in R (sq)	5.56			1.12			12.44			1.66			10.29		
F Change Significance	<.001			.328			<.001			.223			.002		

TE=traumatic exposure; RSS=received social support; SS=social support; Fam=family

Table 6.6.2. Hierarchical regression analysis of received peer support on posttraumatic relationship growth (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.14	0.23	.545	0.14	0.23	.534	0.09	0.22	.699	0.09	0.22	.685	0.05	0.22	.807
Years of Service	-0.09	0.09	.338	-0.06	0.10	.555	-0.06	0.09	.536	-0.06	0.09	.518	-0.04	0.09	.645
Civil Status (with partner=1)	-0.46	0.22	.036	-0.44	0.22	.051	-0.33	0.21	.108	-0.33	0.21	.113	-0.43	0.22	.047
Ethnicity (NZ-Euro=1)	-0.57	0.19	.002	-0.59	0.19	.002	-0.38	0.19	.043	-0.38	0.19	.045	-0.36	0.19	.051
Lifetime TE				-0.12	0.09	.172	-0.06	0.09	.485	-0.07	0.09	.455	-0.06	0.09	.530
Normative stress				0.07	0.09	.406	0.10	0.08	.212	0.10	0.08	.231	0.11	0.08	.203
Duty-related TE							-0.16	0.10	.101	-0.15	0.10	.122	-0.16	0.10	.100
Peer RSS							0.39	0.18	.078	0.39	0.18	.080	0.33	0.18	.129
Duty-related TE X Peer RSS										-0.03	0.09	.711	-0.02	0.08	.854
Perceived SS													0.18	0.11	.105
R (sq)	.09			.10			.25			.25			.27		
F for change in R (sq)	5.56			1.12			21.61			0.34			4.40		
F Change Significance	<.001			.328			<.001			.711			.105		

TE=traumatic exposure; RSS=received social support; SS=social support

Table 6.6.3. Hierarchical regression analysis of received supervisor support on posttraumatic relationship growth (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.14	0.23	.545	0.14	0.23	.534	0.09	0.21	.689	0.06	0.21	.763	0.02	0.21	.909
Years of Service	-0.09	0.09	.338	-0.06	0.10	.555	-0.01	0.10	.921	-0.04	0.10	.700	-0.02	0.09	.836
Civil Status (with partner=1)	-0.46	0.22	.036	-0.44	0.22	.051	-0.32	0.21	.134	-0.30	0.21	.152	-0.43	0.21	.042
Ethnicity (NZ-Euro=1)	-0.57	0.19	.002	-0.59	0.19	.002	-0.32	0.20	.100	-0.34	0.20	.082	-0.33	0.19	.088
Lifetime TE				-0.12	0.09	.172	-0.05	0.09	.580	-0.05	0.09	.559	-0.04	0.09	.615
Normative stress				0.07	0.09	.406	0.06	0.09	.503	0.05	0.08	.547	0.07	0.08	.431
Duty-related TE							-0.21	0.10	.031	-0.17	0.10	.085	-0.17	0.10	.076
Supervisor RSS							0.38	0.14	.021	0.38	0.14	.019	0.31	0.14	.048
Duty-related TE X Sup RSS										-0.15	0.08	.071	-0.12	0.08	.145
Perceived SS													0.23	0.09	.008
R (sq)	.09			.10			.22			.23			.26		
F for change in R (sq)	5.56			1.12			15.79			3.51			7.40		
F Change Significance	<.001			.328			<.001			.071			.008		

TE=traumatic exposure; RSS=received social support; SS=social support; Sup=supervisor

Table 6.7.1. Hierarchical regression analysis of received emotional support on posttraumatic relationship growth (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.14	0.23	.545	0.14	0.23	.534	0.02	0.21	.923	0.02	0.21	.915	0.01	0.21	.966
Years of Service	-0.09	0.09	.338	-0.06	0.10	.555	0.01	0.09	.900	-0.01	0.09	.938	0.00	0.09	.967
Civil Status (with partner=1)	-0.46	0.22	.036	-0.44	0.22	.051	-0.38	0.20	.066	-0.38	0.20	.062	-0.43	0.21	.039
Ethnicity (NZ-Euro=1)	-0.57	0.19	.002	-0.59	0.19	.002	-0.29	0.18	.120	-0.26	0.18	.161	-0.26	0.18	.155
Lifetime TE				-0.12	0.09	.172	-0.07	0.09	.452	-0.07	0.09	.409	-0.07	0.09	.450
Normative stress				0.07	0.09	.406	0.08	0.08	.355	0.07	0.08	.409	0.07	0.08	.373
Duty-related TE							-0.14	0.09	.130	-0.10	0.10	.301	-0.11	0.10	.263
Emotional RSS							0.52	0.08	<.001	0.51	0.08	<.001	0.46	0.10	<.001
Duty-related TE X Emo RSS										-0.13	0.09	.134	-0.12	0.09	0.171
Perceived SS													0.10	0.09	.266
R (sq)	.09			.10			.27			.28			.28		
F for change in R (sq)	5.56			1.12			24.56			2.45			1.26		
F Change Significance	<.001			.328			<.001			.134			.266		

TE=traumatic exposure; RSS=received social support; SS=social support; Emo=emotional

Table 6.7.2. Hierarchical regression analysis of received tangible support on posttraumatic relationship growth (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.14	0.23	.545	0.14	0.23	.534	0.10	0.21	.616	0.11	0.21	.615	0.07	0.21	.721
Years of Service	-0.09	0.09	.338	-0.06	0.10	.555	-0.01	0.09	.940	-0.02	0.09	.854	-0.01	0.09	.924
Civil Status (with partner=1)	-0.46	0.22	.036	-0.44	0.22	.051	-0.36	0.20	.078	-0.36	0.20	.074	-0.44	0.21	.034
Ethnicity (NZ-Euro=1)	-0.57	0.19	.002	-0.59	0.19	.002	-0.32	0.18	.080	-0.31	0.18	.086	-0.31	0.18	.090
Lifetime TE				-0.12	0.09	.172	-0.07	0.09	.420	-0.07	0.09	.425	-0.06	0.09	.469
Normative stress				0.07	0.09	.406	0.10	0.08	.197	0.10	0.08	.207	0.11	0.08	.190
Duty-related TE							-0.16	0.09	.073	-0.14	0.09	.127	-0.15	0.09	.122
Tangible RSS							0.53	0.08	<.001	0.52	0.08	<.001	0.46	0.09	<.001
Duty-related TE X Tang RSS										-0.08	0.08	.341	-0.07	0.08	.352
Perceived SS													0.15	0.09	.090
R (sq)	.09			.10			.28			.29			.30		
F for change in R (sq)	5.56			1.12			27.21			0.98			2.98		
F Change Significance	<.001			.328			<.001			.341			.090		

TE=traumatic exposure; RSS=received social support; SS=social support; Tang=tangible

Table 6.7.3. Hierarchical regression analysis of received informational support on posttraumatic relationship growth (n=223)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p	B	SE B	p
Gender (male=1, female=2)	0.14	0.23	.545	0.14	0.23	.534	0.06	0.21	.766	0.06	0.21	.777	0.02	0.20	.905
Years of Service	-0.09	0.09	.338	-0.06	0.10	.555	0.02	0.09	.801	0.03	0.09	.741	0.04	0.09	.635
Civil Status (with partner=1)	-0.46	0.22	.036	-0.44	0.22	.051	-0.35	0.20	.080	-0.35	0.20	.081	-0.45	0.20	.027
Ethnicity (NZ-Euro=1)	-0.57	0.19	.002	-0.59	0.19	.002	-0.34	0.18	.053	-0.34	0.18	.054	-0.33	0.18	.061
Lifetime TE				-0.12	0.09	.172	-0.06	0.08	.496	-0.05	0.08	.528	-0.05	0.08	.571
Normative stress				0.07	0.09	.406	0.07	0.08	.360	0.07	0.08	.378	0.08	0.08	.320
Duty-related TE							-0.20	0.09	.028	-0.21	0.09	.022	-0.21	0.09	.022
Informational RSS							0.57	0.08	<.001	0.57	0.08	<.001	0.52	0.08	<.001
Duty-related TE X Info RSS										0.06	0.09	.512	0.08	0.09	.387
Perceived SS													0.19	0.08	.020
R (sq)	.09			.10			.31			.31			.33		
F for change in R (sq)	5.56			1.12			32.40			0.46			5.56		
F Change Significance	<.001			.328			<.001			.512			.020		

TE=traumatic exposure; RSS=received social support; SS=social support; Info=informational

Discussion

The findings of the current study provide evidence supporting the main effects model of received social support effectiveness. This model suggests that regardless of conditions related to stress, social support, in itself, is beneficial to the recipient. This was documented by significant correlations of received support with all social adjustment dimensions measured in this study, and by the additional variance explained after the effects of demographic, normative stress, and trauma exposure variables, and perceived social support are controlled. This supports the unique variance contribution of received social support to low work and social impairment scores and high social relationship growth scores following traumatic exposure.

Two dimensions of social adjustment were investigated in this article: social and occupational impairment and posttraumatic relationship growth. Examination of the different support sources revealed that higher amounts of peer and supervisor social support are linked with better social and occupational functioning of emergency responders. Similar findings have been observed in other studies on similar professions. For example, support from co-workers, immediate supervisor, and unit supervisor were associated with lower levels of burnout, higher job satisfaction, and higher productivity among traffic enforcement agents (Baruch-Feldman, Brondolo, Ben-Dayan, & Schwartz, 2002). High amounts of emotional and tangible supports were also associated with fewer functioning deficits in the social and occupational spheres. In the support matching hypothesis, Cutrona and Russell (1990) argued that the form of received social support is a crucial aspect of its effectiveness. They suggested that receiving emotional support helps an individual to sustain stressors that are beyond one's control, while receiving tangible support can assist an individual in dealing with stressors that one can control. It follows that emergency responders who receive assistance from work-related sources function better at work than those who do not receive

enough support. Furthermore, receiving emotional support (e.g., words of comfort, non-judgemental interactions, acceptance) provides sustenance to endure the potentially traumatising nature of their profession, while receiving tangible support (e.g., assistance with tasks, money, practical forms of aid) lightens the workload, strengthens the camaraderie, and in effect, improves social and occupational functioning.

While received social support was found to directly assist emergency responders with social and occupational functioning, the findings of the study also showed that received social support directly influenced positive changes in social relationships after traumatic exposure. Previous studies have pointed out the relationship between social support and resilient outcomes in people in high-risk occupations (e.g., de Terte et al., 2014). Results of the current study show family and supervisor as crucial sources of social support that influenced the level of posttraumatic improvement in social relationships. A meta-analysis of the role of supervisor social support showed such types of support influence perceptions of organisational support and perceived work-family organisational support to further reduce work-family conflict (Kossek et al., 2011). Receiving social support from family was found to influence positive perceptions of meaning in life (e.g., Luszczynska, Pawlowska, Cieslak, Knoll, & Scholz, 2013; Schroevers, Helgeson, Sanderman, & Ranchor, 2010), thereby strengthening social ties and improving relationships.

The current findings also point to received social support having stronger effects on positive outcomes than negative outcomes. This is usually not captured in the literature, as most studies give more importance to the associations with perceived social support at the expense of received social support, with more focus on associations with psychopathological outcomes than with positive ones. The current study focussed on the association of received social support and posttraumatic relationship growth, which deviates from the focus on social support-negative outcome associations found in most studies. Whereas the findings in

this study may be new to emergency responder groups, the association of received social support on posttraumatic growth has been observed in other populations. For example, a longitudinal study showed that cancer patients who received more emotional support, but not perceived emotional support, reported higher levels of posttraumatic growth (Schroevers et al., 2010). A positive correlation was also found between received social support and the PTGI Relating to Others subscale, but not with other PTGI indices, on Hurricane Katrina survivors living with HIV (Cieslak et al., 2009). Both studies pointed out that in terms of growth outcomes, receiving actual support matches the requirements of the stressor, similar to the received support effectiveness mechanism proposed by Cutrona and Russell (1990). So while perceived social support may be directly influencing the decrease in the intensity of psychopathological outcomes, received social support may be assisting growth and other positive outcomes.

The effect of received social support is shown to be inconsistent in the literature. More than having no effect, it is sometimes even associated with negative effects (Maisel & Gable, 2009). Models illustrating social support dynamics, such as the social support deterioration deterrence model (Kaniasty & Norris, 1995, 2009; Norris & Kaniasty, 1996) illustrate received support to have indirect effects, in contrast to the direct effects of perceived social support. However, in comparison to perceived social support, studies examining the effectiveness of received social support in emergency responders are fewer. In addition, studies usually link received social support with negative outcomes (Guilaran et al., 2018). The current study diverges from most of the literature by testing the link between received social support and positive psychological outcomes. The findings of the current study suggest that received social support may directly influence positive outcomes and indirectly influence, through perceived social support, negative outcomes. This suggestion must be tested further.

It is also interesting to note that, as revealed by correlations, emergency responders of NZ (European) ethnicity reported lower posttraumatic relationship growth than the non-NZ (European) ethnicity group. Although the study did not isolate the specific elements of ethnicity that might have effected this difference, this lends support to the studies conducted on the cultural differences in social support dynamics (Chen et al., 2012; Herbert et al., 2018; Kaniasty & Norris, 2000; S. E. Taylor et al., 2004). Changes in relationships after traumatic exposure may be influenced by how the self is seen in relation to others, and some ethnic groups see the self as more infused in the societal structure than others (Markus & Kitayama, 1991), as in collectivistic and individualistic cultures (Hui & Triandis, 1986). Furthermore, these differences may be affected, not just by cultural factors, but by socio-economic factors, such as the amount of resources associated with certain social groups and societies (Kaniasty & Norris, 2000; Stringhini et al., 2012) as well as support utilisation behaviours associated with these cultures (Kaniasty & Norris, 2000; Kim, Sherman, & Taylor, 2008). However, these explanations are offered with reservations, as the analyses only went as far as correlations. Future research on social support in emergency responders should look into these moderating variables.

Although received social support was observed to be associated with improvement in social relationships after traumatic exposure, high levels of traumatic exposure were observed to be associated with lower amounts of received social support. Furthermore, traumatic exposure was also associated with the erosion of relationship (e.g., low PTGI Relating to Others scores). These findings are consistent with observations of relationship deterioration following traumatic exposure, such as disasters (e.g., Bonanno et al., 2010). These observations also offer insight as to the inability of received social support to (reverse) buffer the effects of traumatic exposure on social adjustment. Traumatic exposure may influence both the deterioration of received social support and posttraumatic relationship quality;

thereby, affecting the potency of received social support to enact any (reverse) buffering effect. As the research is cross-sectional, this explanation is speculatory and should be examined in future studies.

The study is not without limitations. There are disproportionately more participants based in New Zealand than in the Philippines. There are also more firefighters than other types of emergency responders among the participants. This means the variable relationships observed in this study may reflect the psychological characteristics of these dominant groups in the sample. The cross-sectional design of the study also prevents it from making causal inferences. Notwithstanding these limitations, the study was able to tease apart the association of received social support with outcomes, which is often not focussed on in most studies. The study also explored these associations on the different facets of social adjustment, which provided a comprehensive view of the construct. Finally, the study's unique contribution is its focus on the social adjustment of emergency responders, which has rarely been done in the past. Particularly, the study measured positive social adjustment outcomes, which adds to the disproportionately low number of studies on social support and positive outcomes in emergency responders (Guilaran et al., 2018). On a theoretical level, findings of the study lends support to the main effects model, but not to the buffering or reverse buffering, or effect enhancement models (i.e., magnification of effects).

Due to the cross-sectional nature of the study, directionality of effects cannot be assumed. However, the results put the relationship of social support with these health outcomes of emergency responders in context. One may benefit from social support, but these benefits have limitations. Regardless of exposure to work-related traumatic events, supervisor and emotional support are consistently linked with better social adjustment, which suggest harnessing these supportive elements to optimise positive outcomes. Given the correlations between ethnicity and received social support, the recipient's cultural background should also

be considered when designing support interventions in multicultural settings. As the world becomes more culturally complex, these nuances become even more crucial. Future research should look into the relationship between social support and social adjustment as influenced by culture orientation and other sociocultural factors in the context of an increasingly multicultural social sphere.

Chapter Seven: Support effectiveness and consequences as mediators of received and perceived social support in emergency responders

Abstract

Received social support influences perceived social support, but the processes underlying this relationship has not yet been fully explored. This study tests the mediating effects of received social support effectiveness and negative consequences on the relationship between received and perceived social support in emergency responders. Participants in this cross-sectional study were 223 emergency responders from New Zealand and the Philippines who answered an online questionnaire measuring received social support, perceived social support, support effectiveness (i.e., Quantity Match, Quality Match, Provider Skilfulness, Support Difficulty, Support Provider Initiative), and negative consequences of support (i.e., Indebtedness, Guilt, Inferiority, Unworthiness, Stupidity, Helplessness). Findings showed received social support, received support effectiveness, and negative consequences correlated with perceived social support. However, multiple regression analysis showed only received peer ($B = 0.26, p < .001$) and family ($B = 0.17, p < .001$) support positively predicted perceived social support. Simple mediation analyses showed received support effectiveness and received support negative to have no indirect effect on the relationship between received and perceived social support. Different processes explain the link between the different forms of received social support and perceived social support in emergency responders.

Introduction

The understanding of the psychological benefits of social support has been increasingly more understood in recent years (e.g., French, Dumani, Allen, & Shockley, 2018). It is also

becoming clearer that social support is not a unidimensional construct; it has different facets, and that these different aspects have varying degrees or even varying directions of effect (Guilaran, de Terte, Kaniasty, & Stephens, 2018). Social support is defined as behaviours and social interactions that provide actual assistance and embed people in a network of social relationships that are deemed to be caring and loving (Hobfoll & Stokes, 1988). This definition highlights three important facets: received support (receipt of actual support), perceived support (perception of support quality and availability), and social embeddedness (structural component of support) (Kaniasty & Norris, 2009). These different facets are not interchangeable (Uchino et al., 2011; Wills & Shinar, 2000) and are found to have varying effects on psychological outcomes. Although evidence linking perceived social support with positive psychological outcomes has been consistent (Haber et al., 2007; Stanley et al., 2018), there is a wide variability of outcome associations with received social support; it may even be linked with negative outcomes (e.g., Maisel & Gable, 2009).

Of particular interest in this manuscript is the relationship between received and perceived social support. One issue concerning this relationship is the inconsistency of the magnitude of their correlation, with correlation coefficients ranging from .01 to .64 (Haber et al., 2007). The weak correlations are argued by some researchers as a result of poor measurement of received support. However, it may also be due to the different processes involved in the development of these social support facets. For example, perceived support is understood to have stemmed from the early stages of psychological development, while received support may be linked to situational factors, as a response to stress (Uchino et al., 2011). In other words, perceived social support may be conceived as an individual differences process (Nurullah, 2012), similar to self-esteem, social skills, and optimism; while received support may be viewed as an individual-environmental process, similar to stress-and-coping processes.

The benefits of receiving support have eluded researchers for decades. A number of models attempted to explain the effectiveness of this social support dimension in modifying psychological outcomes. Cutrona and Russell's (1990) support matching hypothesis suggested that for received support to be effective, the support provided should match the support needed. Rini, Dunkel Schetter, Hobel, Glynn, and Sandman (2006) and Rini and Dunkel Schetter (2010) further suggested a model of social support effectiveness (SSE). They proposed that effective received support is that which (1) matches the quantity and quality of support needed and provided, (2) is given by a provider that is perceived to be skilful, (3) is not difficult to obtain, and (4) is offered without being asked. For instance, a person needing a listening ear but instead gets unsolicited advice may cause more distress—the opposite of the intended effect—and is therefore ineffective. Furthermore, they asserted that the effectiveness of received social support also rests on the consequences of receiving support. Rini et al. (2006) enumerated six negative consequences of receiving support that may hamper support effectiveness: feeling indebted, guilty, dependent or inferior, unworthy or undeserving, stupid, and helpless or inadequate. For example, receiving support that affects people's sense of efficacy or worthiness is deemed ineffective support.

Furthermore, the effectiveness of social support to modify psychological outcomes may be influenced by the source of support. Uchino and colleagues (2011) proposed that the quality of relationship the recipient has with the support source influences the effectiveness of received social support. Interpersonal closeness is also seen as a factor that determines the effectiveness of received support (Rini et al., 2006). Different sources of support may be conceived as having varying degrees of interpersonal closeness with the support recipient and, support from these sources may have varying degrees of effectiveness.

These different models offered explanations on how received social support directly influences psychological outcomes. However, a number of studies have argued that received social support can modify perceptions of support (Kaniasty & Norris, 1995b, 2009; Norris & Kaniasty, 1996). For example, individuals who have received support in the past (received social support) may have a more positive appraisal of the amount or quality of support that they expect to receive in the future (perceived social support) than those who have not received as much support. Modification of external support has also been shown to change perceptions of support in experimental settings (Barrera, Glasgow, McKay, Boles, & Feil, 2002). On its own, received social support contributes to psychological change (Nurullah, 2012), but received social support that influences perceived social support arguably has more potency to effect psychological outcomes. These formed the bases for the aims of the current study. First, the study aimed to test for the main effects of received social support on perceived social support. Second, the study aimed to test for the mediating effects of received social support effectiveness on perceived social support. Third, the study aimed to test the mediating effects of the negative consequences of receiving social support on perceived social support.

Another issue with social support research is the tendency of treating the construct as unidimensional and testing its effects on aggregated community samples (Cutrona, 1990). Recent trends indicate an increasing recognition of the differential effects of the different social support components, and the varying degrees of effectiveness of social support on different sections of the population (Chu, Saucier, & Hafner, 2010; French et al., 2018; Guilaran et al., 2018). To better understand the dynamics underlying social support processes, the present study focusses on emergency responders, professionals who are tasked to protect and preserve life and property after emergencies (Prati & Pietrantoni, 2010b). These professionals face critical events on a regular basis, and are at risk of developing a

wide range of psychological outcomes (Benedek et al., 2007; Brooks et al., 2016). However, they are also found to benefit from having social support (Brewin & Holmes, 2003; Prati & Pietrantoni, 2010b).

Finally, the various sources of social support were also found to have differential effects on psychological outcomes (e.g., French et al., 2018). The current study investigated whether the source of social support matters when considering the modification properties of received support effectiveness and consequences on perceived social support. The literature on social support in emergency response work identifies two crucial groups of support providers: work and nonwork providers (Stanley, Hom, & Joiner, 2016; Stephens et al., 1997). With this factored in, the current study sought to test the mediating effects of received social support effectiveness and received social support negative consequences across three support sources: close family member (nonwork source), and peers and the immediate supervisor (work sources).

Methods

Participants and procedure

Emergency responders from New Zealand (n=195) and the Philippines (n=28) participated in the study. Emergency responders were affiliated with an emergency response organisation at the time of participation. Most participants identified as males (n=171), New Zealanders of European ethnicity (n=152), and were connected with fire service (n=157). Average age of participants was 43.19 years (SD=12.01). The study employed a cross-sectional design. Participant recruitment and data collection was done from 1 May 2017 until the 31 December 2017. Recruitment was performed through social media postings and through internal communications within several emergency response organisations. Participation was mainly

through an online questionnaire, with an option to participate through paper-and-pencil format. Data used in this study was part of a bigger research which measured flourishing, perceived social support, traumatic exposure, PTSS, psychological distress, work and social impairment, received social support, support effectiveness, support consequence, normative stress, posttraumatic relationship growth, and religious activities.

Measures

Received social support

Received social support was measured using the Berlin Social Support Scale (BSSS) Recipient Version (Schwarzer & Schulz, 2000). This questionnaire was modified from having an agreement-disagreement response choice to having a frequency response choice (i.e., never=1, rarely=2, sometimes=3, often=4, and always=5). Item 3 ("This person left me alone.") was added a qualifier ("abandonment") to ensure correct understanding of the item. The current study used the full 14-item scale and measured received social support from three difference sources: family ($\propto = .94$), peers ($\propto = .92$), and supervisor ($\propto = .94$).

Perceived social support

Perceived social support was measured using the Interpersonal Support Evaluation List-12 (ISEL-12, S. Cohen, Mermelstein, Karmarck, & Hoberman, 1985). The scale measures the perception of availability of support, and can be answered using a four-point scale ranging from definitely false to definitely true. In this study, the scale score had a Cronbach's alpha of. 88.

Mediating variables

Two mediating variables were tested in the study: received social support effectiveness (RSSE) and the received social support negative consequences (RSSNC). Items on the RSSE

were based on the work of Rini et al. (2006). The five items of the scale measured the match between amount of support received and preferred, the match between the kind of support received and preferred, the skilfulness of the provider, the difficulty of getting support, and whether support is provided without being asked. Items were answered using a five-point Likert-type scale measuring the extent of effectiveness (e.g., never offers without asking – always offers without asking). The scale score was computed by averaging the score across all items. The score on the item tapping into the difficulty in obtaining support was reversed to be consistent with the valence of the other items. In this study, RSSE from family ($\propto$= .85), peers ($\propto$= .82), and supervisor ($\propto$= .85) were measured separately.

The RSSNC scale was also based on previous work by Rini et al. (2006). The items in this scale tapped into the negative consequences of receiving support (i.e., indebtedness, guilt, inferiority, unworthiness, stupidity and helplessness). Items were scored "1" if they experienced the specified consequence or "0" if otherwise. The scale score was obtained by adding the score across the six items. RSSNC from family ($\propto$= .67), peers ($\propto$= .79), and supervisor ($\propto$= .69) were measured in the current study.

Data analyses

Zero order correlations were calculated to assess the shared variance of the different variables in the study. To test for the main effects of received social support on perceived social support, multiple regression analyses using the Enter method was performed, with family, peer, and supervisor support regressed on perceived social support. Finally, simple mediation (model 4) analyses were conducted to test the mediating effects of RSSE and RSSNC on the received support-perceived support relationship. Different mediation analyses were performed across different sources of support (for examples, see Fig. 7.1 and 7.2). The bootstrapping test, which sampled the dataset 5,000 times, was primarily used to test for the

mediating effects at 95% confidence interval (Hayes, 2009). The bootstrapping method was performed as it overrides the assumptions of normality for conducting the mediation analysis (Hayes & Scharkow, 2013). For all regression analyses, outliers were excluded using casewise deletion at 3 standard deviations. Correlation analyses, multiple regression analysis, and mediation analyses were carried out using SPSS version 25. Process MACRO (Hayes, 2013) was primarily used in carrying out the mediation tests.

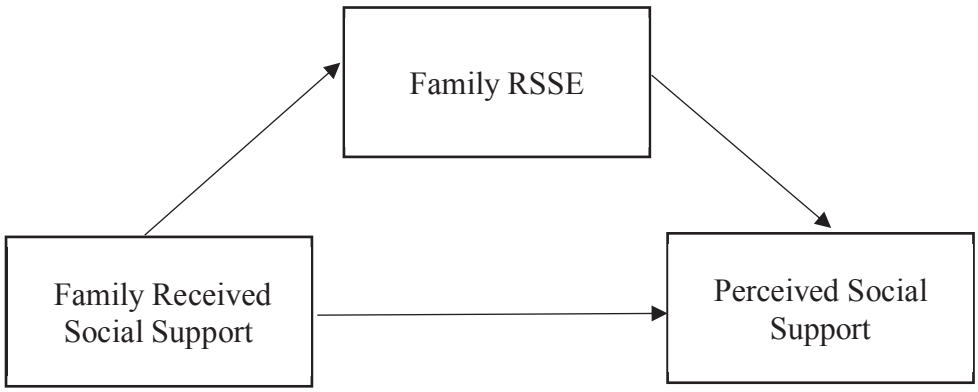

Fig. 7.1. Family received social support effectiveness (RSSE) as hypothesised mediator of family received social support and perceived social support

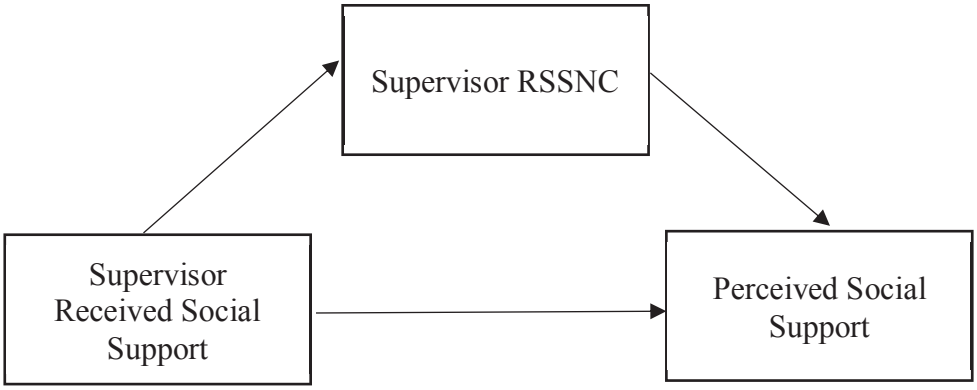

Fig. 7.2. Supervisor received social support negative consequences (RSSNC) as hypothesised mediators of supervisor received social support and perceived social support

Results

Table 7.1 shows the means and standard deviations, and the correlations of perceived social support, received social support, RSSE of the different sources, and the RSSNC of the different sources of support. Received social support variables had moderate to high correlation with perceived social support, with peer support having the largest correlation ($r = .47, p < .001$). On the other hand, receiving social support was associated with high support effectiveness across all three sources ($r = .75\ to\ .82, p < .001$). However, high received social support was also associated with low scores on RSSNC, albeit to a weaker extent. High received support effectiveness was also associated with low negative consequences scores. Furthermore, receiving support from one source was correlated with receiving support from another. Correlations were also observed between RSSE and RSSNC among the different sources.

Table 7.1. Correlation matrix of predictor, outcome, and mediating variables

	n	Mean (SD)	1	2	3	4	5	6	7	8	9
1. Perceived Social Support	223	3.15 (0.53)									
2. Family RSS	221	3.53 (0.89)	.41***								
3. Peer RSS	220	3.29 (0.78)	.47***	.36***							
4. Supervisor RSS	219	3.08 (0.89)	.32***	.38***	.63***						
5. Family RSSE	223	3.40 (0.91)	.31***	.80***	.22**	.31***					
6. Peer RSSE	223	3.24 (0.80)	.33***	.15*	.75***	.53***	.23***				
7. Supervisor RSSE	223	3.05 (0.92)	.27***	.23**	.53***	.82***	.30***	.62***			
8. Family RSSNC	223	0.51 (1.03)	-.17*	-.20**	-.03	.02	-.24***	-.14*	-.04		
9. Peer RSSNC	221	0.69 (1.33)	-.19**	-.11	-.17*	-.01	-.15*	-.29***	-.11	.43***	
10. Supervisor RSSNC	221	0.53 (1.06)	-.15*	-.13	-.14*	-.23**	-.21**	-.27***	-.32***	.37***	.66***

*p<.05, **p<.01, ***p<.001; RSS=received social support; RSSE=received social support effectiveness; RSSNC=received social support negative consequences

While all three sources of received support were correlated with perceived social support, putting them together in one model showed peer received social support as the stronger predictor of the three (Table 7.2). On the other hand, supervisor received support was unable to explain the change in perceived social support scores. The combination of all three sources of received support explained 28% of perceived social support variance.

Table 7.2. Multiple regression analysis of the different sources of received support on perceived support

	B	SE B	Sig
Family	0.17	0.04	<.001
Peer	0.26	0.05	<.001
Supervisor	-0.02	.05	.702
R^2	.28		
F	27.04		
Sig.	<.001		

Although received social support had direct effects on perceived social support, simple mediation analyses showed that RSSE from the different sources mediated this relationship. For example, received peer support predicted perceived social support ($B = 0.34, p < .001$), peer RSSE did not ($B = -.03, p = .595$). Subsequently, no indirect effects were found. In the same manner, RSSNC from the different sources of received support also were unable to mediate the link between received social support and perceived social support.

Discussion

The study explored the extent to which social support effectiveness and negative consequences explain the connection between received social support and perceived social support. Results showed these hypothesised mediators to have no mediating effects in the context of emergency responders. These results show that receiving social support was

associated with perceiving social support, and that effective received social support was also correlated with perceived social support. Furthermore, experiencing more negative consequences of receiving social support was associated with lower scores of perceived social support. However, neither the effectiveness nor the associated negative consequences of receiving social support explained how received social support was linked to perceived social support.

The Social Support Effectiveness (SSE) hypothesis (Rini & Dunkel Schetter, 2010; Rini et al., 2006) presented a comprehensive theoretical lens for understanding the effectiveness of received social support. This model was originally tested on pregnant women, in relation to the support they received from their partners, and was also tested on the support received from friends and relatives by the disaster survivors of the Lushan Earthquake in China (Shang et al., 2019). The current study departed from these studies in at least three ways. First, the current study focussed on a different sample—emergency responders. These group of individuals face stressors different from the expectant mothers and disaster survivors, and arguably have unique social support needs as well. Second, the source of received social support was different in the current study. Unlike the previous investigations on the SSE, the present study explored the effects of receiving support from family, peers, and supervisor. Although this was somewhat similar with the sources of support examined by Shang et al., the current study diverged by teasing apart the differential effects of three various sources of support.

Third, the previous studies on SSE focussed on the effects of SSE on psychological outcomes. The current study differed by its use of the SSE to explain the variance contribution of received social support on perceived social support. Received and perceived social support were argued to be different processes—non interchangeable but related; one,

an external-situational facet and the other, an internal-individual dimension (Uchino, 2009). In the context of disasters, Kaniasty and Norris (1995b; Norris & Kaniasty, 1996) proposed that received social support indirectly impacts psychological outcomes through perceived social support (Kaniasty & Norris, 1995b; Norris & Kaniasty, 1996). The Conservation of Resources theory (Hobfoll, 2009; Hobfoll et al., 1990) also posited that having social resources (e.g., received social support) prevents the loss of personal resources (e.g., perceived social support)and may even modify it (e.g., social resources increasing personal resources). In other words, received social support may not only maintain perceived social support, but it may also to change it. The current study attempted to explain this perceived support modification process through the SSE and the negative consequences of received social support.

The results of the analyses supported the relationship between received and perceived social support. However, it did not support the idea of SSE and negative consequences as mediators of received and perceived social support. The inability of these variables to mediate the relationship between received social support and perceived social support may be due to sample and the sources of support measured in the current study (which differed from the sample in the other SSE studies) and the model employed (i.e., mediation of received and perceived social support). However, it may also be due to methodological issues. As noted by Hobfoll (2009), there are conventionally different frames employed in the measurement of received and perceived social support. Received social support is usually measured in reference to a specific time frame, and by asking about micro-events. In the current study, received support in the past four week was measured. On the other hand, perceived social support is usually measured without any temporal anchor and with reference to a more general sense of support availability and/or quality. In the current study, support effectiveness and support consequences were in reference to the received support time frame

and received support micro-events; hence, both variables inherit the existing measurement disparities between received and perceived social support.

However, it may also be possible that there are other factors that are more potent in modifying perceived social support other than the effectiveness of received support or its negative consequences. For example, perceived social support was found to be correlated with personality (DeViva et al., 2016; Roohafza et al., 2016), which is internal, more stable, and arguably, more influential than received social support and related constructs, which are external, more variable, and unstable. On the other hand, it may also be that received social support effectiveness and negative consequences mediate the relationship between received social support and psychological outcomes (e.g., Rini & Dunkel Schetter, 2010; Rini et al., 2006) without having to go through the perceived social support path.

Across the three sources of support measured in the study, peer support and related variables were consistently observed to have higher correlations with perceived social support. This was followed by family support and by supervisor support, respectively. Uchino et al. (2011) proposed that relationship quality (e.g., interpersonal closeness) influences the effectiveness of received support. Given these findings, support from peers may be the most influential on perceived support among the three—emergency responders who received more support from their colleagues were observed to also have better appraisal of support availability. These results lend support to the conduct of peer support programs on emergency responders such as the police and firefighters. Future studies should explore the effective elements of peer support.

Intercorrelations were also observed between the different sources of received support, their effectiveness, and their negative consequences. This supports the idea of resource caravans (Hobfoll, 2012, 2014). The concept of resource caravans suggested that acquisition of some

resource may lead to acquisition of other resources. In the context of social support, receiving support from one source (e.g., peers) may lead to receiving support from another (e.g., supervisor). This experience, in effect, may lead to better appraisal of social support, which, in turn, may modify perceived social support.

The results of the study should be viewed in light of its limitations. First, the scales measuring the negative consequences of receiving support had low reliability coefficients. Future studies exploring this variable should create better measures. Second, an attempt was made to explore the effects of the different components of support effectiveness. However, the subscales generated had very low Cronbach's alphas, which precluded the conduct of post-hoc analyses. The study also focussed only on emergency responders, who are a special group of people in terms of stress exposure and social support needs; hence relationships of variables observed here may not necessarily hold true for other cross-sections of the population. These mediating variables should also be tested in other sections of the population. Furthermore, the relationship between received and perceived support may be viewed in various ways. The current study only tested the model where received support influences perceived support. Findings of this study should be viewed more as exploratory rather than conclusive, and findings should be interpreted with caution.

In spite of these limitations, the study was able to test the mediating effects of received support effectiveness and negative consequences in emergency responders. Results of the study did not support the idea of received support-perceived support being linked by support effectiveness and negative consequences. Yet, this opens up other avenues of exploration in terms of figuring out the factors that facilitate the modification effects of received social support on perceived social support. Future studies should look into testing the mediating effect of these variables using better measures, or exploring other possible mediators. The

current study was also able to test the differential effects of the different received support sources on perceived social support; results of which support the findings in other studies showing the unique variance contributions of the different levels/source of support on psychological outcomes (de Terte, Becker, & Stephens, 2009). Knowing how actual support influences the positive and negative changes in support appraisal and eventually, psychological outcomes would be very useful in making sure that support provided—for emergency responders and for people, in general—is support that actually works.

As a meta-construct, social support has various interrelated dimensions with differential effects on different health outcomes. Just as illustrated in the study, social support provided is not the same as social support perceived. Yet between the two, the literature points to perceived support as the facet more consistently associated with positive outcomes. It is therefore imperative to understand the interrelationships of these dimensions in order to optimize the benefits of receiving these supportive interactions. This is especially crucial in groups of people, such as emergency responders, who have a high need of resources, including social resources, as a means of coping with intensely stressful situations. Findings of the study showed that there is still a large amount of perceived support variance that cannot be explained just by receipt of support alone, or by the mediators tested in the study. Future research should continue to explore other variables that link these social support facets, to understand how actual support can make one feel supported.

Chapter Eight: General discussion

People spontaneously provide social support in the aftermath of emergencies and disasters. Studies have consistently shown that social support is a cornerstone of psychological recovery following mass emergencies and disasters (Hobfoll et al., 2007). However, a caveat in the majority of the social support studies is the neglect of received social support. This thesis aimed to add to the discussion on the effectiveness of received social support on psychological outcomes. This thesis specifically focussed on emergency responders—professionals who provide support to others following emergencies, disasters, and other catastrophic events.

This chapter revisits the aims of the study and summarises its major findings. It also discusses the study's theoretical contribution to understanding social support processes and its practical contribution to the improvement of emergency responder wellbeing. This chapter also proposes suggestions for future studies in the area of social support in emergency responders. Finally, the limitations of this thesis are summarised.

Research aims

In order to investigate the effectiveness of received social support on psychological outcomes of emergency responders, two meta-analyses and one study (which resulted in three manuscripts) were performed. The first meta-analysis synthesised the effect sizes of social support on various psychological outcomes in disaster first responders. The second meta-analysis summarised the effect sizes of social support on posttraumatic stress symptoms of emergency responders. The study proper investigated the associations of received social support on posttraumatic stress symptoms and social adjustment of New Zealand and Philippines emergency responders. It also tested for the mediating effects of social support

effectiveness and received support negative consequences on the received support-perceived support association in emergency responders.

These manuscripts attempted to answer the aims of the study, which are (1) to test for the main effects of received social support on posttraumatic stress symptoms and social adjustment on emergency responders, (2) to test for the moderating effects of received social support on posttraumatic stress symptoms and social adjustment of emergency responders, and (3) to identify mediators of the association between received and perceived social support in emergency responders. Below is a summary of the variable relationships found in the study (Fig. 8.1):

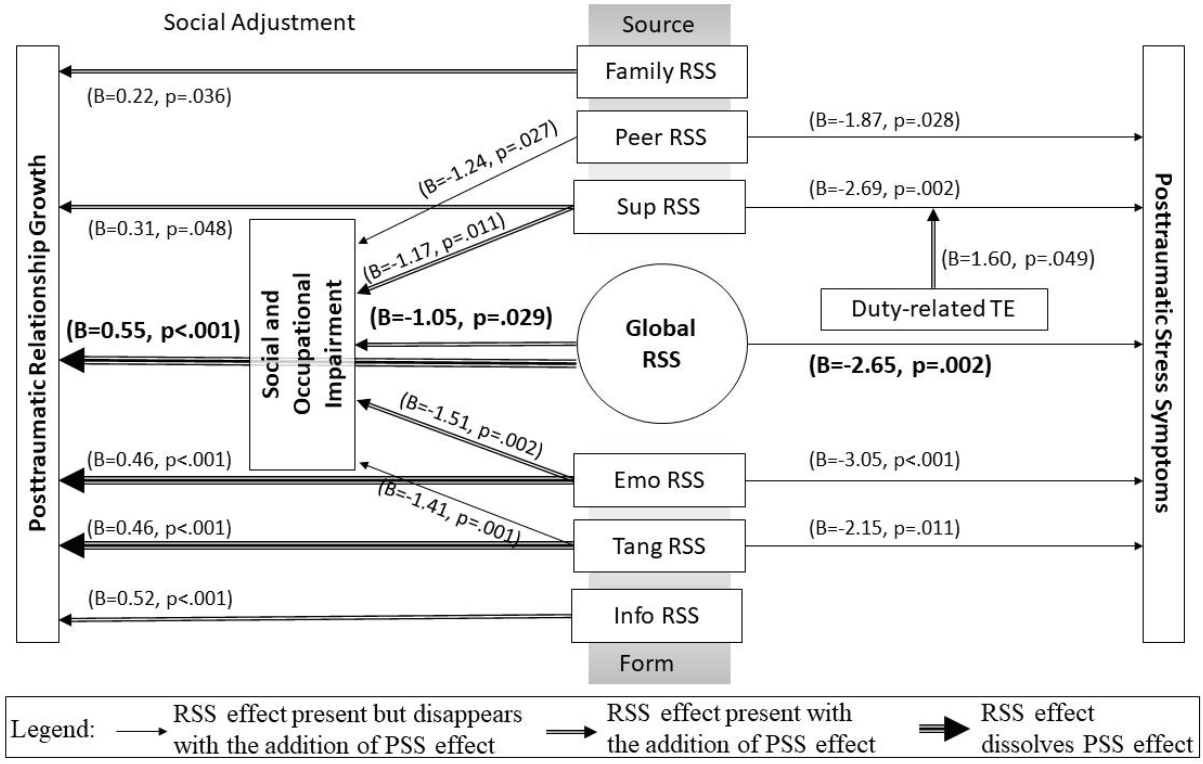

Fig. 8.1. Summary of the relationships between received social support (RSS), posttraumatic stress symptoms, social and occupational impairment, and posttraumatic relationship growth. Note: PSS = perceived social support; TE= traumatic exposure; Sup=supervisor; Emo=emotional; Tang=tangible; Info=informational

Testing for the main effects of received social support

The study tested for the main effects of received social support on posttraumatic stress symptoms and social adjustment on emergency responders. The two meta-analyses (manuscripts one and two) charted the landscape of social support associations with psychological outcomes in emergency responders. The first meta-analysis showed that social support is associated with a wide range of psychological outcomes, from normative to clinical outcomes, in disaster responders. The degree of association between social support and these outcomes also appeared to weaken as the outcomes move towards the clinical range. Differential associations were also observed among the various facets of social support, and differences in degree of correlation were found across the different types of responders. Furthermore, the degree of influence that social support has on psychological outcomes also appeared to decrease in the immediate aftermath until about three years post-disaster. In this meta-analysis, the effect of perceived social support was found to be more robust than that of the other social support facets. Psychological distress and posttraumatic stress symptoms (PTSS) were also the most studied outcomes in disaster responders.

The second meta-analysis focussed on the main effects of social support on posttraumatic stress symptoms (PTSS). The second manuscript expanded the scope of the population of interest to emergency responders in general (i.e., working in disaster and non-disaster emergencies). In this study, perceived social support was still the most examined facet of social support. Differences in the degree of association were still observed between responder type. Similar effect sizes were found across the various sources of support, with work sources of support having slightly higher weighted mean effect sizes than nonwork sources. Associations of social support and PTSS were stronger in some geographical locations than in others. For example, correlations between social support and PTSS were

stronger in emergency responders in Australia and New Zealand than the correlations observed in East Asian emergency responders.

These observations informed the conduct of the study proper. In both meta-analyses, it was salient that very little attention was given to received social support. It is important to place this scarcity of studies in the limelight as people provide and receive social support in times of emergencies and disasters. Since received social support is often used in these catastrophic events, its effectiveness must be thoroughly understood. Yet the significantly low number of studies on emergency responders in those reviews pointed to an inconclusive finding about the degree of influence that received social support has on psychological outcomes, including its association with PTSS. This justified the focus on received social support and on PTSS for the study. Furthermore, the inconsistent results across the studies reviewed in the two meta-analyses suggested the possible presence of moderating variables interacting with its effect. The differences in effect across the various study locations, and the recognition of the socio-cultural dimension of social support, informed the decision to include ethnicity as a control variable in the current study. In the first meta-analysis, there was also the apparent lack of investigations on social psychological and/or positive outcomes, which formed the basis for the focus on social adjustment as an outcome of interest in the fourth study.

This thesis tested the main effects of received social support on PTSS in New Zealand and Philippine emergency responders. Received social support was found to be negatively correlated with total PTSS. However, when controlled for the effects of demographic variables, trauma exposure, and perceived social support, received social support did not influence the changes in the level of PTSS in emergency responders. This thesis tested the associations of received social support with social adjustment variables and also found significant correlations. In contrast to the observations in the PTSS study, received social

support predicted social adjustment even when adjusted for the effects of the control variables.

Emotional support was consistently negatively correlated with PTSS and social and occupational impairment, and was positively correlated with posttraumatic relationship growth. On the other hand, high amount of supervisor support was found to be associated with low level of PTSS and social and occupational impairment, and high level of posttraumatic relationship growth. The findings of this research point to these components of received social support as crucial predictors of these psychological outcomes.

Testing for the moderating effects of received social support

This thesis also tested the moderating effects of received social support on posttraumatic stress symptoms and social adjustment in emergency responders. The study wanted to find out if interaction effects existed between received social support interacted with duty-related traumatic exposure on PTSS and social adjustment. The moderating effects of received social support from family, peers, and supervisor were tested.

Results showed that of the different sources of received social support, only the support from the immediate supervisor moderated the effects of duty-related traumatic exposure on PTSS. This moderating effect is characterised as reverse-buffering. When the amount of support from the supervisor is considered, emergency responders who have experienced high level of duty-related traumatic exposure were observed to also have high levels of PTSS when they received high amounts of supervisor support. This observation suggested that supervisor received support may have an exacerbating effect on the impact of duty-related traumatic exposure on PTSS. On the other hand, no other interaction effects were found with other sources or forms of received social support.

Moderating effects of the different sources and forms of received social support were also tested on the effect of duty-related traumatic exposure on the social adjustment of emergency responders. However, unlike the results found in the analysis concerning PTSS, no moderating effects were found.

Identifying mediators that link received-perceived support relationship

Finally, the study attempted to identify the factors that explain the relationship between received social support and perceived social support in emergency responders. This thesis employed the perspective that increase in the amount of received social support modifies psychological outcome by positively influencing perceived social support. This thesis hypothesised that received support effectiveness positively, and negative consequences negatively explain how received social support modifies perceived social support as elaborated by the social support effectiveness hypothesis. Results showed that while support effectiveness and negative consequences were positively and negatively correlated with perceived social support, respectively, they did not explain the relationship between received and perceived social support.

Implications

This research offers a number of contributions to the study of social support. First, the present study is one of the few that focusses on received social support. As illustrated by the two meta-analyses, there are a number of studies on perceived social support. As argued in this thesis, not giving equal importance to received social support is a missed opportunity to learn about the elements of this construct that can be harnessed to effect positive psychological change. Being the environmental-situational facet of social support, received social support can be shaped and adjusted externally to produce the desired effect, but careful consideration must be made with regards to the conditions in which received support,

particularly its different components, is effective. Of particular concern is the provision of supervisor support, which may have the opposite of the intended effect.

This leads to another contribution of this research, which is the untangling of the different components of received support and their associations with posttraumatic stress symptoms and social adjustment. This thesis illustrated the differential effects of the various forms of social support on psychological outcomes. The study specifically focussed on the various components of received social support, and found differences in associations between the different components and posttraumatic stress symptoms and social adjustment.

Studies usually find perceived social support to have a larger effect size on outcomes than received social support (e.g., Prati & Pietrantoni, 2010b). The findings in this thesis, which looks at the effects of social support on PTSS, are parallel with these general trends. On the other hand, a different pattern of effect size difference was also observed in the study. Here, received social support had a larger effect size than perceived social support on posttraumatic relationship growth. This draws attention to the main effects of received social support. Generally, social support has been studied in the context of stressful conditions, on its property of buffering the harmful effects of adverse exposures. However, it may well be that perceived social support, but not necessarily received social support, exhibit these buffering effects (e.g., Cohen et al., 2000; Pow et al., 2017; Wethington & Kessler, 1986). In addition, very few studies have concentrated on the associations of social support on positive outcomes. However, the results of the study also present alternative ways of looking at the effectiveness of social support, particularly of received social support.

Findings of this thesis highlight two important ways of looking at the effectiveness of received social support. First, it appears that perceived social support has the stronger main effects on PTSS ($r = -.39, p < .001$) than received social support ($r = -.19, p < .01$).

Second, it appears that received social support is better than or of equal strength with, in terms of its main effects on social and occupational impairment (SOI) ($r = -.30, p < .001$) and posttraumatic relationship growth (PTRG) ($r = .51, p < .001$), perceived support on SOI (no correlation was found at $p < .05$) and PTRG ($r = .48, p < .001$). The dissolution of the effects of perceived social support in the hierarchical regression analyses on PTRG when the effects of received social support are accounted for suggests that received social support may have a stronger effect than perceived social support on this psychological outcome. In other words, results imply that perceived social support—the individual/personal facet of social support—has more potency in effecting change on more psychological outcomes that are closely related to intrapersonal resources (e.g., PTSS, psychological distress), while received social support—the situational/environmental facet—has stronger influence on the psychological consequences that are more closely linked to social/external resources (e.g., social and occupational functioning, improvement in social relationships).

Another interesting observation is how perceived social support overshadowed the effect of received social support on PTSS. When the effects of received social support are compared between PTSS, SOI, and PTRG, its effect is largest on PTSS. Yet, when the effect of perceived social support is factored in, its effect gets dissolved. So while these results imply that perceived social support has stronger effects than received social support on PTSS, this also suggests the probability that perceived social support may, in fact, mediate the effects of received social support on PTSS. In other words, receiving social support in the context of emergency response may be beneficial because it modifies perceived social support. This mediating effect has been illustrated in the context of disaster survivors (e.g., Kaniasty & Norris, 1995b). This mediating relationship would be worth exploring in future studies.

However, it must also be pointed out that there are inherent issues with the measurement of perceived social support. It must be emphasised that social support are external resources

that are time-bound, finite, and concrete and must be measured as such. The current research topography favours the measurement of perceived social support, which is usually conceived in more global, less specific terms, which consequently yield more positive results; over received social support, which is more specific and concrete, which may or may not result in statistically significant results. If one should study the effectiveness of social support, it is imperative that these concrete interactions (i.e., received social support) be measured and not just the global sense of being supported. So while the results of the study showed perceived support to have a stronger influence on the negative outcomes, these methodological issues should be kept in mind (a more thorough discussion on the importance of studying received social support is offered by Hobfoll, 2009).

Rini et al. (2010) and Uchino et al. (2011) also proposed that relationship quality with the support provider also plays an important role in the effectiveness of received social support. In the present research, received social support from three major providers were tested: family, peers, and supervisor. Findings from this thesis showed supervisor support moderates the effect of traumatic exposure on PTSS. This research project did not test for relationship quality, per se, but it tested for the differential effects of the various sources of received social support. What this research showed is that support providers have varying degrees of influence over the effectiveness of received social support, which may be due to provider characteristics or the relationship quality between the provider and the recipient. In the case of PTSS, supervisor support may even aggravate the outcome. Future research may look into the role that relationship quality plays in moderating these effects on emergency responders. This also presents a very important point: that different sources of support have varying degrees and directions of effectiveness. For research to be more informative, it should avoid measuring social support from all sources as a single construct (i.e., undifferentiated).

As noted earlier, the findings also support the idea of a received social support-perceived social support path towards psychological outcomes, at least on PTSS. The Social Support Deterioration Deterrence (SSDD) model (Kaniasty & Norris, 1995b, 2009) proposed that received social support modifies psychological distress through perceived social support. Prati and Pietrantoni's meta-analysis (2010b) concurs with this idea, further suggesting that the medium to large effect sizes associated with perceived social support indicate a more proximal effect, while the small to medium effect sizes associated with received social support show a more distal effect. The same pattern of findings was found on the investigations on PTSS. However, results concerning the effect of social support on social adjustment does not fully support the mediational model (e.g., SSDD model) of received-perceived support path, but rather, is consistent with the direct effects models of received social support on outcomes (e.g., Cutrona & Russell, 1990; Rini & Dunkel Schetter, 2010; Uchino et al., 2011).

The larger correlation coefficients of received social support associated with social and occupational impairment and especially, posttraumatic relationship growth, and the low probability of observed effects of perceived social support when added to the regression model, suggest that the path proposed by the SSDD model may only be applicable as far as psychological distress is concerned. These findings further suggest that a different set of social support dynamics and interrelationships may be at play when it comes to posttraumatic relationship growth. Identifying these processes requires further studies. A possible path to be tested is that of received social support-posttraumatic relationship growth-perceived social support; that is, to test posttraumatic relationship growth as a mediating variable between received and perceived social support. It may be that if received social support leads to positive changes in social relationships, it is better translated to perceived social support. In other words, posttraumatic relationship growth may mediate the relationship between

received and perceived social support. Receiving a good amount of support may increase the perceived value of helping each other, therefore augmenting, and in effect, modifying, and not just maintaining perception of support.

Ethnicity was found to be correlated with received social support but not in perceived social support. One way of explaining this is through ethnic differences in the provision of social support. Studies have found ethnic differences in social support dynamics in the context of disasters (e.g., Kaniasty & Norris, 2000) and in the general context (e.g., Chen et al., 2012; Taylor et al., 2004). Correlations concerning ethnicity in the present study point to emergency responders of NZ (European) ethnicity receiving lower amounts of social support than their non-NZ (European) counterparts. This suggests that there are probably ethnicity differences in mobilisation and utilisation of social support but not the appraisal of support quality and availability. While this may be the case, it has to be emphasised that the way ethnicity was coded in the study, due to data limitations, did not allow for strong conclusions. Rather, these findings only provide a small evidence of the influence of ethnicity and should be tested further using more rigorous methods. Future research should examine more closely the role of ethnicity in the effects that these social support facets have on psychological outcomes.

This research is one of the few that focusses on the associations of received social support and psychological outcomes in emergency responders. Studies have pointed to social support as one of the cornerstones of psychological recovery after traumatic exposure (Hobfoll et al., 2007). While this research does not invalidate the findings on the link between social support and PTSS (Brewin et al., 2000; Ozer et al., 2003), it does suggest that perceived social support has stronger effects than received social support. Findings show that the main effect of received social support on PTSS is small. This effect also becomes overshadowed by perceived social support. However, there are received social support elements that work

better than other elements. Whereas the provision of social support to alleviate PTSS needs to be considered carefully to avoid risk of exacerbating symptoms (given the mixed results found in this study), there is a lower risk of providing received social support to enhance posttraumatic relationship growth and improve social and occupational functioning in emergency responders.

Limitations

This section only discusses the broader limitations of the study.

The study did not include the time between the trauma exposure and the symptoms; hence, posttraumatic stress disorder, in diagnostic terms, were not used in the study. Instead, the study measured posttraumatic stress symptoms. While this, in itself, is not a weakness, the degree of clinical significance of the study only goes as far as symptoms are concerned. The study would also have benefited from having pre-trauma measures, in order to have more certainty regarding the effect of social support on PTSS and social adjustment. This may be difficult to do, as studies concerning the effects of traumatic events usually germinate after after traumatic events have occurred. The cross-sectional design of this study also have not allowed the establishment of directionality of effects, which is a major limitation of the study. In this regard, the term "prediction" is used loosely in this study. However, future studies could employ prospective designs. One way of conducting this type of research would be engaging emergency response organisations to give entrants to the service a battery of instruments which can be used as baseline measures.

It would have improved the study greatly if there were more participants from the Philippines. The endorsement of the New Zealand Professional Firefighters Union created a significant impact in the number of participants in New Zealand. On the other hand, no organisation in the Philippines endorsed the study, despite efforts to have them on board the

study. One way in which the number of participants may have increased in the Philippines is by enlisting the support of emergency response organisations. Most of the participants in the study were New Zealanders, especially those with European ethnicities. Because of participant turnout, the planned analysis of comparing New Zealand and Philippines was changed to the comparison of New Zealanders of European ethnicity and the non-NZ (European) ethnicity. This, in itself, is informative; however, the changes in terms of ethnicity categories shifted the analysis from the test of differences in terms of two ethnicity groups to testing the differences of New Zealand (European) group in contrast to the non-NZ (European) ethnicity group, which was treated as a control group.

Similarly, there are considerably more participants from the fire service than from any other emergency response organisations. This means that the results of the study should be interpreted while bearing in mind that they might be more reflective of the characteristics (e.g., demographics, organisational culture) of people from the fire service. A major reason for the dominance of firefighters in the sample pool was the endorsement given by the firefighters union. As this has proven to be an effective way of enlisting participants in these kinds of professions, future research in this demographic will benefit from having the support of the emergency response organisations.

Given the exploratory nature of the mediation analysis part of this thesis (Chapter Seven), some scales used in the mediation between received social support and perceived social support also have low reliability coefficients. Since there were no good scales measuring the negative consequences of received support, general items were constructed for the purpose of this research. These scales should have undergone a much more thorough reliability testing. Finally, the inclusion of other variables in the study would have added to its explanatory value. For example, the addition of self-efficacy (Benight & Bandura, 2004)could possibly have explained a large amount of variance from received social support to both outcomes and

perceived support. However, a very lengthy questionnaire was also avoided in the conduct of the study; hence, the decision to keep the variables to a minimum.

Future research

This study has pointed out a number of suggestions for future research in the area. Below is a summary of these recommendations:

1. The study could be replicated with a larger, more representative sample size.
2. Received social support form supervisors was consistently observed to have an effect on the psychological outcomes in this study. Future research may look into the differential effects of the different components/elements of supervisor support on positive and negative psychological outcomes.
3. The current study tested the effectiveness of received social support on emergency responders as a general group. The study could be replicated on specific responder groups, such as firefighters or police.
4. This study only focussed on sources of support within a more intimate social space. Future studies should also look into the effect of community support on emergency responders.
5. Aside from the differential effects of the various sources of received social support, future research may also look into the influence of relationship quality on the effectiveness of received support on psychological outcomes.
6. Received social support was found to have the strongest link with posttraumatic relationship growth among the three psychological outcomes measured in the study. Studies could be performed testing PTRG as a mediator between received social support and perceived social support.

7. Although perceived social support overshadowed the effect of received social support on PTSS, it would be interesting to test the mediating effect of perceived social support on the effect of received social support on PTSS.
8. The role of ethnicity in the relationship between received support, perceived support, and psychological outcomes could be examined better in future studies.
9. There should be better scales to measure social support effectiveness and social support consequences.
10. Understanding the role of the workplace culture would also be useful in putting the effectiveness of workplace social support on psychological outcomes in context.
11. Prospective studies would make more conclusive results. Having pre-trauma measures would be useful in pinning down the effects of social support on psychological outcomes. Studying the effect of the type of trauma on posttraumatic psychological outcomes in emergency responders will also help in the understanding of how these events interact with the amount of support received.

Conclusion

This thesis aimed to test the main and moderating effects of received social support on posttraumatic stress symptoms (PTSS) and social adjustment in emergency responders. The findings of this research supported the main effects model, and to a certain extent, the reverse buffering model. Findings of this research showed that the main effects of perceived social support on PTSS is larger than that of received social support. On the other hand, received social support was observed to have a stronger effect on posttraumatic relationship growth. In addition, only supervisor support moderated the effects of traumatic exposure on PTSS. Finally, this thesis also tested for variables that may explain the relationship between received social support and perceived social support.

These results showed that there are differences in the processes involved in the link between emotional, tangible, and informational support, and perceived social support. The findings of this thesis contributes to the understanding social support processes, particularly in emergency response work, where social support plays a huge role. As with any element of intervention, the effectiveness of social support is within certain conditions. Whereas it presents as a sustainable form of psychosocial intervention, this research shows that there are supportive elements that can be harnessed to optimise the beneficial effects, and there are elements that should be employed with caution to minimise causing more harm. Finally, results of this research underscores findings in previous research, that social support is, indeed, one of the cornerstones of psychological recovery. However, every supportive element has its unique contribution to the different elements of recovery, and this is something that needs to be understood further in future research.

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Appendices

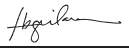
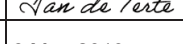
Appendix A: Statements of Contribution (DRC 16)

DRC 16

MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

STATEMENT OF CONTRIBUTION
DOCTORATE WITH PUBLICATIONS/MANUSCRIPTS

We, the candidate and the candidate's Primary Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of candidate:	Johnrev Guilaran
Name/title of Primary Supervisor:	Dr Ian de Terte
Name of Research Output and full reference:	
Psychological outcomes in disaster first responders	
In which Chapter is the Manuscript /Published work:	Chapter Two
Please indicate:	
• The percentage of the manuscript/Published Work that was contributed by the candidate:	85%
and	
• Describe the contribution that the candidate has made to the Manuscript/Published Work:	
The candidate did the data collection, analysis, wrote the first draft, and revised the draft.	
For manuscripts intended for publication please indicate target journal:	
International Journal of Disaster Risk Science	
Candidate's Signature:	
Date:	6 May 2019
Primary Supervisor's Signature:	
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DOCTORATE WITH PUBLICATIONS/MANUSCRIPTS

We, the candidate and the candidate's Primary Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of candidate:	Johnrev Guilaran
Name/title of Primary Supervisor:	Dr Ian de Terte
Name of Research Output and full reference:	
Social support and posttraumatic stress symptoms: A meta-analysis	
In which Chapter is the Manuscript /Published work:	Chapter Three
Please indicate:	
• The percentage of the manuscript/Published Work that was contributed by the candidate:	85%
and	
• Describe the contribution that the candidate has made to the Manuscript/Published Work:	
The candidate did the data collection, analysis, wrote the first draft, and revised the draft.	
For manuscripts intended for publication please indicate target journal:	
International Journal of Stress Management	
Candidate's Signature:	
Date:	6 May 2019
Primary Supervisor's Signature:	
Date:	6 May 2019

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Name of candidate:	Johnrev Guilaran
Name/title of Primary Supervisor:	Dr Ian de Terte
Name of Research Output and full reference:	
Received social support and posttraumatic stress symptoms	
In which Chapter is the Manuscript /Published work:	Chapter Five
Please indicate:	
• The percentage of the manuscript/Published Work that was contributed by the candidate:	80%
and	
• Describe the contribution that the candidate has made to the Manuscript/Published Work:	
The candidate did the data collection, analysis, wrote the first draft, and revised the draft.	
For manuscripts intended for publication please indicate target journal:	
Journal of Traumatic Stress	
Candidate's Signature:	JGuilaran
Date:	6 May 2019
Primary Supervisor's Signature:	Ian de Terte
Date:	6 May 2019

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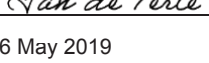
Name of candidate:	Johnrev Guilaran
Name/title of Primary Supervisor:	Dr Ian de Terte
Name of Research Output and full reference:	
Social adjustment in New Zealand and Philippine emergency responders	
In which Chapter is the Manuscript /Published work:	Chapter Six
Please indicate:	
• The percentage of the manuscript/Published Work that was contributed by the candidate:	80%
and	
• Describe the contribution that the candidate has made to the Manuscript/Published Work:	
The candidate did the data collection, analysis, wrote the first draft, and revised the draft.	
For manuscripts intended for publication please indicate target journal:	
Social Indicators Research	
Candidate's Signature:	
Date:	6 May 2019
Primary Supervisor's Signature:	
Date:	6 May 2019

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Appendix B: Diagnostic Criteria for Posttraumatic Stress Disorder in Adults

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5, American Psychiatric Association, 2013) presents the following criteria for posttraumatic stress disorder (PTSD) in adults. This following information is copied from the DSM-5:

A. Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:
    1. Directly experiencing the traumatic event(s).
    2. Witnessing, in person, the event(s) as it occurred to others.
    3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the
    4. event(s) must have been violent or accidental.
    5. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains: police officers repeatedly exposed to details of child abuse).

Note: Criterion A4 does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related.

B. Presence of one (or more) of the following intrusion symptoms associated with the traumatic event(s), beginning after the traumatic event(s) occurred:
    1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s).

       Note: In children older than 6 years, repetitive play may occur in which themes or aspects of the traumatic event(s) are expressed.
    2. Recurrent distressing dreams in which the content and/or affect of the dream are related to the traumatic event(s).

Note: In children, there may be frightening dreams without recognizable content.

3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.)

   Note: In children, trauma-specific reenactment may occur in play.

4. Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).
5. Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

C. Persistentavoidanceofstimuliassociatedwiththetraumaticevent(s),beginningafter the traumatic event(s) occurred, as evidenced by one or both of the following:

   1. Avoidance of or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
   2. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

D. Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:

   1. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs).

2. Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., "I am bad," "No one can be trusted," 'The world is completely dangerous," "My whole nervous system is permanently ruined").
3. Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.
4. Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).
5. Markedly diminished interest or participation in significant activities.
6. Feelings of detachment or estrangement from others.
7. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).

E. Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:
   1. Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects.
   2. Reckless or self-destructive behavior.
   3. Hypervigilance.
   4. Exaggerated startle response.
   5. Problems with concentration.
   6. Sleep disturbance (e.g., difficulty falling or staying asleep or restless sleep).
F. Duration of the disturbance (Criteria B, C, D, and E) is more than 1 month.
G. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
H. The disturbance is not attributable to the physiological effects of a substance (e.g., medication, alcohol) or another medical condition.

Specify whether:

With dissociative symptoms: The individual's symptoms meet the criteria for post-traumatic stress disorder, and in addition, in response to the stressor, the individual experiences persistent or recurrent symptoms of either of the following:

1. Depersonalization: Persistent or recurrent experiences of feeling detached from, and as if one were an outside observer of, one's mental processes or body (e.g., feeling as though one were in a dream; feeling a sense of unreality of self or body or of time moving slowly).
2. Derealization: Persistent or recurrent experiences of unreality of surroundings (e.g., the world around the individual is experienced as unreal, dreamlike, distant, or distorted).

Note: To use this subtype, the dissociative symptoms must not be attributable to the physiological effects of a substance (e.g., blackouts, behavior during alcohol intoxication) or another medical condition (e.g., complex partial seizures).

Specify if:

With delayed expression: If the full diagnostic criteria are not met until at least 6 months after the event (although the onset and expression of some symptoms may be immediate).

Appendix C: Ethics Approval Notice

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

Date: 21 February 2017

Dear John Guilaran

Re: Ethics Notification - **SOB 16/28 - Social Support and Disaster First Responders: A Comparison of New Zealand and Philippine Samples**

Thank you for the above application that was considered by the Massey University Human Ethics Committee: Human Ethics Southern B Committee at their meeting held on Tuesday, 21 February.

Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

Yours sincerely

Dr Brian Finch
Chair, Human Ethics Chairs' Committee and Director (Research Ethics)

Research Ethics Office, Research and Enterprise
Massey University, Private Bag 11 222, Palmerston North, 4442, New Zealand T 06 350 5573; 06 350 5575 F 06 355 7973
E humanethics@massey.ac.nz W http://humanethics.massey.ac.nz

Appendix D: Methodological Contributions

The main method of data collection was through an online questionnaire. This method was chosen because the study involved gathering data in two countries. The coverage of the data gathering in terms of geographic scope necessitated the use of a cost-effective method that can reach a large number of participants. The nature of the study also involved sensitive information, and the use of the online questionnaire allowed for anonymous responding. Participants were also given the option to answer the questionnaire through paper-and-pencil format, but only two participants chose this option (only one completed). Several considerations were made in the design of the online questionnaire. One of the major issues encountered was the length of the questionnaire. The study measures multiple variables and this, consequently, led to a lengthy questionnaire, which took approximately 45 minutes to an hour to finish. Because of this, scales were carefully chosen so that superfluous items are removed. In the case of different scales measuring the same construct, the shorter scales—or the scales that are easier to answer—were chosen over the longer and/or more complicated ones. During the pretesting, the items were also evaluated, making sure that they are easy to understand for both New Zealand and Philippine participants. This reduced the questionnaire length to 30 to 45 minutes.

Another consideration was the layout of the questionnaire. The questionnaire was formatted for desktop and for mobile screens, so that participants may be able to easily respond to it using the device of their choice. Because of the busy and highly stressful nature of the participants' work, it was anticipated that they will not be able to answer the questionnaire in one sitting; therefore, it was designed to be able to store responses for two weeks from the time of first access. A progress bar was also placed in order to give participants an idea of how far they have gone through the questionnaire.

The order of the scales was also taken into consideration. This was especially necessary due to the nature of the topic and the characteristics of the sample. Easier to answer questions were placed at the beginning so as not to intimidate participants from answering further. Scales asking about traumatic exposure were placed in the middle and the more emotionally-neutral scales were placed at the end. This was to minimise emotional distress by the end of answering the questionnaire.

The Placement of Demographic Items

Conventionally, items measuring demographic variables are placed either at the beginning or at the end of the questionnaire. The problem with placing it at the beginning of the questionnaire is that it may come across as intrusive. The problem with placing it at the end is that it may be forgotten or neglected, which could hamper analyses. In order to deal with this dilemma, demographic items were placed strategically throughout the questionnaire (Part A (disaster/emergency work experience), four items after Part F, one item after Part G, and three items after Part M). The primary reason for this placement is for these items to be less intrusive, as they do not appear all at once. Yet, if intrusion is the concern, these items could all be placed at the end of the questionnaire. It was deemed, however, that doing so will increase the probability of these items not being answered; hence, these items were placed in various points within the questionnaire. The placement of the demographic items also offered a break from Likert-type items, which was thought to help lessen response sets. One drawback from doing this format was that several demographic items were missed, especially those towards the end of the questionnaire, which invalidated some responses. One way to improve the use of this format is to place the more important demographic variables at the beginning of the questionnaire.

The Use of Random Response Indicators

Random, inattentive, or careless responses to the research instrument were detected using bogus items following the instructed item format. The method of bogus items for detecting these types of responses makes use of items that have correct answers, which is one the preferred ways of dealing with these kinds of issues in data gathering (Meade & Craig, 2012). Instructed items are those that ask the participants to make a particular correct response (e.g., "For this item, please circle "not at all"). Meade and Craig, who did a testing of the different methods of identifying careless responses, especially for internet-based surveys, also suggest a 1:50-100 ratio for bogus item-questionnaire item, with a maximum of three, as having too many of these may elicit negative responses from the participants. Given the total number of items in the research instrument, three bogus items were placed in the different parts of the questionnaire (Part E No. 21, Part G No. 6, Part L No. 22) and a cut-off of two (or more) incorrect response were flagged.

The Use of Positive Mood Priming Items

Some of the items in this questionnaire were thought to probably cause distress to some participants. In order to minimise the negative after effects, three positive mood priming questions were added at the end of the questionnaire (Part T). These questions were patterned after items used in mood-priming studies.