# Towards Comprehensive Job Stress Models of Reservists

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vorgelegt von

Diplom-Psychologin
Jessica Lang, geb. Ippolito

Dekan: Prof. Dr. Josef Brüderl

Erstgutachter: Prof. Dr. Rupert Hölzl

Zweitgutachter: Prof. Dr. Werner W. Wittmann

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*To Jonas*

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| | |
|---|---|
| **CFA** | Confirmatory Factor Analysis |
| **CFI** | Comparative Fit Index |
| **ERI** | Effort-Reward Imbalance |
| **GHQ** | General Health Questionnaire |
| **ISR** | Institute for Social Research |
| **NNFI** | Non-Normed Fit Index |
| **ORISE** | Oak Ridge Institute of Science and Education |
| **ORAU** | Oak Ridge Associated Universities |
| **PHQ** | Personal Health Questionnaire |
| **PTSD** | Post Traumatic Stress Disorder |
| **SEM** | Structural Equation Modeling |
| **1SGT** | 1st Sergeant |
| **SOC** | Sense of Coherence |
| **SRMR** | Standard Root-Mean Square Residual |
| **T1** | Time 1 |
| **T2** | Time 2 |

**USAMRMC** U.S. Army Medical Research and Materiel Command

**USAMRU-E** United States Army Medical Research Unit-Europe

**USERRA** Uniformed Services Employment and Reemployment Rights Act

**WRAIR** Walter Reed Army Institute of Research

# Abstract

Integrating findings from the general stress literature into occupational stress research the present dissertation aimed at developing comprehensive job stress models that include additionally valuable antecedents and moderators on the link between workplace stress and psychological health problems. Therefore, this work made use of McEwen's (1998) *Allostatic Load Model* to analyze the influence of chronic as well as acute stressors on the employees' (i.e., Reservists) long-term psychological health outcomes (Study 1). Additionally, within the same theoretical framework, Study 2 analyzed the effectiveness of individual characteristics in moderating the negative stressor impact on psychological health, considering the controllability of the stressors. Finally, using Siegrist's (1996) *Effort Reward Imbalance Model*, Study 3 analyzed the potential of individual characteristics as well as organizational resources to alter the work stress impact. The study sample consisted of 654 U.S. Reservists who were sent on a one year deployment to Europe. Survey data from pre- and post-deployment indicated some support for the postulated job stress models' extensions. First, considering both chronic and acute stressors was valuable as chronic stressors reduced the adaptation to acute job demands in terms of increasing psychological health problems at post-deployment ($\beta = .25$, $p < .05$). Second, the effectiveness of an individual's capacity to adapt to stressors through coping skills and personal characteristics like self-efficacy should be always considered in relation to the nature of the stressor. For uncontrollable situations some generally acknowledged resiliency constructs may be harmful (i.e., self-efficacy $\beta = -.20$, $p < .001$) while some palliative coping strategies like avoidance might be more useful in preventing long-term psychological health consequences (i.e., passive coping $\beta = .14$, $p < .05$). Finally, organizational resources like monetary reward ($\beta = -.11$, $p < .001$) and social esteem ($\beta = -.07$, $p < .05$) could function as valuable compensations for required employee

effort on the job as they lead to the lowest reports of depressive symptoms following deployment. From a theoretical viewpoint the findings of the dissertation imply that expanding job stress models to include chronic stressors and considering the specific nature of the stressors can lead toward a deeper understanding of the process that affect individual's long-term health. From an applied perspective the findings offer some useful implications for organizational policies and intervention program design.

*Keywords:* Occupational Stress, Chronic vs. Acute Stressors, Allostatic Load Model, Effort-Reward Imbalance Model, Reservists

# Preface

This dissertation was based on research conducted at the Walter Reed Army Institute of Research (WRAIR). The set of studies described here were carried out at the United States Army Medical Research Unit-Europe (USAMRU-E) in Heidelberg, Germany, under the scientific supervision of Dr. phil. Rupert Hölzl, professor for clinical and biological psychology at the University of Mannheim, Faculty of Social Sciences.

USAMRU-E is an oversea's laboratory of the WRAIR in Wahsington, D.C., USA. The main headquarter is the U.S. Army Medical Research and Materiel Command (USAMRMC) at Fort Detrick, MD. First established on September 1st, 1997 USAMRU-E's mission is to conduct basic and applied medical research for the purpose of protecting, optimizing, and enhancing warfighter psychological health and resilience.

The data used for this study have been collected under WRAIR Research Protocol #931 entitled, "Enhancing the readiness and well-being of Soldiers and families defending the homeland." The research protocol #931 was reviewed and approved by WRAIR's Human Use Research Committee. The protocol was funded by the Research Area Directorate for Military Operational Medicine (LTC Karl Friedl), at USAMRMC in Ft. Detrick, Maryland. Principal investigators of this research project were Dr. Doris B. Durand and Dr. Paul D. Bliese.

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outreach endevour, intended to enhance the background and experience of students and to give them an opportunity to make a research contribution in their field of study.

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Correspondence concerning this disseration should be addressed to Jessica Lang, Klausenerstraße 8, 52066 Aachen, Germany, or sent via e-mail to `jessica.lang@psycube.de`.

Aachen, June 2006 Jessica Lang

# 1. Introduction

## 1.1. Occupational Stress Research

Occupational stress is a major issue around the globe. Since its beginnings in the 1960's occupational stress research has linked job stress to behavioral (e.g., performance), psychological (e.g., job attitudes) and also physiological (e.g., health) outcomes for the individual (Jex, 1998; Spector, Dwyer, & Jex, 1988). However, the consequences of job stress are not only limited to the individual, they also affect the organizations and society in general (Hart & Cooper, 2001; Kelloway & Day, 2005). These consequences include national health care costs as well as organizational costs due to reduced productivity and worker's absenteeism (Jex, 1998).

The typical workplace stressors identified in past research were role stressors, workload, interpersonal or situational constraints, perceived control as well as traumatic job stressors to name but a few (for an overview see Jex, 1998). These stressors have been studied within the frameworks of different job stress models. One of the earliest occupational stress models came from the Institute for Social Research (ISR) at the University of Michigan and was called the *ISR Model of Work Stress* (French & Kahn, 1962). In order to analyze what influences an individual's physiological, behavioral, and affective response, the model distinguished between the objective organizational environment and the appraised psychological environment as well as individual differences and the social environment within the organization. Another model in occupational stress research that has received much attention is the *Demand-Control Model* (Karasek, 1979). This model has focused on the stressful workplace situation in which a worker faces a large amount of job demands but does not have any control (i.e., decision latitude) over his job task. According to a third job stress model

called *person-environment fit* (Caplan, 1987), strain is caused when there is a misfit between a worker (i.e., his/her job skills, values, etc.) and the organization (i.e., its requirements, culture, etc.).

What all of these job stress models have in common is their focus on the organizational work environment. Thus, the majority of occupational stress studies has analyzed the job situations and has focused on the workers' actual work setting and how it influences individuals' health or job-related outcomes. This research has been fruitful to some extent because it has aided in the development of theoretically-driven intervention programs to prevent impaired well-being due to an unhealthy work environment. While it is very important to have a clear understanding of the working conditions of employees, it may be helpful to expand job stress models beyond the study of job-specific stressors.

For example, models from general stress research have included individual characteristics (e.g., coping) as either mediators or moderators of the stress-outcome relationship (e.g., the transactional theory of stress and coping by Lazarus & Folkman, 1984). These findings have already been successfully integrated in the analyses of occupational stress (e.g., de Rijk, Le Blanc, Schaufeli, & de Jonge, 1998; Eriksen & Ursin, 1999; Jex & Bliese, 1999). Therefore, researchers should refer to the knowledge of neighboring research to further, develop, improve and adopt occupational stress research models towards the current work context in occupational settings.

There are several possible ways to expand job stress research models. The following section provides some descriptions of alternatives based on findings from other stress research domains. The different suggestions will be explained in more detail below.

First, there has been a call in the literature to extend job stress research to include chronic stressors (e.g., Day & Livingstone, 2001; Dewe, 1991; van der Ploeg, Dorresteijn, & Kleber, 2003). Researchers point to the fact that not only the acute job demands of daily task performance affect an individual's health and well-being but chronic stressors from outside the actual work-environment may also affect health and well-being. Employees carry these chronic stressors into their daily job, which may include personal health issues or problems with their family or general non-work life problems.

Second, in the last decades society has gone through major changes, which affected

the different social roles a person fulfills within different life domains (Frone, 2003). These societal changes had an influence on the workplace context as well as the nature of people's work and family life (Lewis & Cooper, 1999).

Third, research models should specify the nature of the stressors they include. Different types of stressors could have different effects for moderator and outcome variables. Especially, the (un)controllabilty of a situation is of key importance when it comes to the individual's stress response (Haidt & Rodin, 1999). Not paying enough attention to the potential manageability of a stressor may lead to inconsistent findings in research, for example, when interpreting the functionality of individual moderators.

Fourth, the importance of the immediate work environment should not be ignored. Past job stress models have provided little information on organizational resources of the work environment that may have a buffering impact on employees' perception of job stress.

These four theoretical and applied concepts should be considered in any expansion of the basic job stress models. Each of these concepts will now be considered in turn.

### 1.1.1. Chronic Stress Research

A person's stress reaction cannot be seen as an isolated process. Individuals always respond to a demand according to their genetic limitations, previous life experiences and actual psychological and physical conditions (Sapolsky, 2004). Thus, when an employee faces an acute job demand his or her reaction and performance might be influenced by several pre-existing factors including chronic demands.

In an experimental study Schaubroeck and Ganster (1993) found that chronic stressors led to a degeneration of the peripheral sympathetic nervous system and consequently to reduced arousal necessary for coping with acute stressors. Thus, an individual faced with chronic demands may be less effective in performing tasks required by acute stressors as the individual's chronical stress response to the unresolved stressors impairs the acute stress response. Schaubroeck and Ganster (1993) conclude that the effects of chronic job demands on the individual's capability to respond to acute stressors may generalize to the reaction of stress exposure in other

life domains. Thus, there is a physiological rationale behind the detrimental effect of chronic stressors on acute job stress reactions. However, this fact has not been integrated into a theoretical job stress model, yet.

Consequently, there has been little job stress research that has included chronic stressors in its analyses (for an exception see Day & Livingstone, 2001; Frone & McFarlin, 1989; van der Ploeg et al., 2003). These few studies only provided limited information regarding any theoretical background for including chronic stressors. Furthermore, to the author's knowledge, only one study tested for an interaction of chronic and acute stressors (see van der Ploeg et al., 2003). However, a model from basic stress research that considers both chronic and acute stressors is McEwen's (1998) *Allostatic Load Model*. This model describes general paths of influence from stressors to an individual's well-being and thus can easily be applied to specific environments with the corresponding stressors (e.g., work environment).

The sources of chronic stress are manifold. They can result from individual health problems, as suggested by the chronic pain literature (e.g., Karoly & Ruehlman, 1996). They can result from work itself (see Day & Livingstone, 2001; Schaubroeck & Ganster, 1993) and they can also be the result of problems from other life domains (e.g., family).

## 1.1.2. Work-Family Balance

### The changed nature of the work and home environment

In the last decades the changing nature of work has placed additional demands on employees. The sources of this changed job market include increased competition and globalization due to the high speed of technological advances (Lewis & Cooper, 1999). Organizations responded to these work changes by downsizing, restructuring, and outsourcing (Martin & Freeman, 1998). Thus, for the individual worker there remained less job security and stability. Fewer people are doing more and more work. It is increasingly unlikely for someone to receive a permanent contract and to remain in one company until retirement. Instead, companies increasingly rely on independent contractors.

For the individual, these organizational changes mean that in order to keep up

with the competitive work environment employees are required to be more flexible and more mobile. This may include working far away from home, commuting back home only at the weekends or being on frequent and prolonged business trips. This new issue of *geographical mobility* has been found to be one major contributor to stress-related disorders (Ellis & Gordon, 1998) as this special working condition can have a significant impact on the individual's non-work life, and thus lead to increased strain the employee is carrying over into the actual job.

Not only has the work environment changed in the last decades, but familiy demographics have also changed. For example, there is an increased proportion of women working outside the home, so that there are more dual-earner families. However, the divorce rates have increased, so that there are also more single-earner families. Also, life expectancy has increased, which has led more families with the simultaneous demands of child care and eldercare (Allen, Herst, Bruck, & Sutton, 2000; Frone, 2003).

One line of research has specifically considered both increased demands in the work and family domain through analysis of work-family balance. This research recognizes that work and family are in fact interconnected domains (Voydanoff, 2005). One can say that research on work-family conflict extended occupational stress research by also taking into account the influence of the family life domain on the work environment and vice versa.

### Work-Family Conflict

When studying the work-family interface researchers have developed different kinds of models that explain the relationship between work and family life (for an overview see Edwards & Rothbard, 2000). Among these different models, the *resource drain model* predicts a negative relationship between work and family. The assumption is that due to finite resources (i.e., time, energy, attention) increasing demands in one life domain (e.g., family) will reduce the availability of the same resources in other life domains (e.g., work). For example, there is research on work to family conflict that found job demands, such as high workload that required employees to bring work home, directly affected the family environment (Voydanoff, 2005). Moreover, there

is some research on family to work conflict suggesting that job performance is not solely influenced by stressors within the workplace but that stressors due to specific family conditons interfere with worker productivity (e.g., Grzywacz et al., 2005). Grzywacz et al. (2005) found that parents cut back at work because of ill children at home. The reduced productivity was related to parents' limited opportunities for recovery from their job at home.

These findings are in line with research on the causes of family to work conflict due to the role environment (Frone, 2003). Specifically, *work or family stressors* (e.g., ill children) can cause distress within the individual in a specific role. The distress may lead to cognitive preoccupation or reduced levels of psychological and physical energy (e.g., little recovery; Frone, Russell, & Cooper, 1992; Grzywacz & Marks, 2000). Similarly, *psychological involvement* - which signifies the level of identification with a social role (e.g., as a parent) - has been positively related to family to work-conflict as high psychological involvement in one role can make an individual mentally preoccupied with that role while being physically in the environment of a second role (e.g., on the job; Adams, King, & King, 1996; Frone et al., 1992). Finally, and most simply *behavioral involvement* - which represents the amount of time spent within a specific role (e.g., work hours) - has been linked to increased conflict between work and family (e.g., Grzywacz & Marks, 2000; Gutek, Searle, & Klepa, 1991).

In sum, these findings reveal that family and work life function as two dynamic dependent systems with no strict separation. Demands in the work domain can easily interfere with the family domain. For example, when an employee is required to go on prolonged business trips, the demands from the work domain interfere with his family role. Problematic circumstances within the family resulting from this work requirement (e.g., the absence of the employee) may turn into a chronic stressor for the affected individual who may be physically on the job but cognitively preoccupied about the family's situation.

### 1.1.3. Uncontrollability

When looking at individual responses to job stress (i.e., individual moderators), researchers should consider the nature of the job stressors, themselves. As mentioned

earlier individual characteristics have been identified as critical factors in understanding the impact of stress on the individual. However, not all individual characteristics or coping styles are equally effective for confronting all types of stressors. For example, the most effective style depends in part on how controllable a stressor is. The construct of control has its roots in basic animal learning studies (e.g., Weiss, 1971) and still plays a major role in modern psychology (Haidt & Rodin, 1999).

Basic animal stress research has found that whether a stressor is controllable (i.e., if it is possible to avoid or escape the stressor) or uncontrollable makes a difference in the stress response of the organism (e.g., Prince & Anisman, 1984; Tsuda & Tanaka, 1985). In particular, impossible or unavailable behavioral coping methods have been associated with a strong physiological stress response (i.e., elevated cortisol level) which, in turn, has been linked with reduced health outcomes. Similar findings were also reported in research with human subjects (for an overview see Dienstbier, 1989). As stress responses depend on the nature of the stressor, it is likely that adaptation strategies are more or less effective depending on the stressor encountered. Findings from previous research have already pointed towards this potential relationship (Bliese & Stetz, in press; Ippolito, Adler, Thomas, Litz, & Hölzl, 2005; Schaubroeck & Merritt, 1997; Weisenberg, Schwarzwald, Waysman, Solomon, & Klingman, 1993). Thus, individual moderators such as coping strategies should not be interpreted as general resiliency constructs without referring to the specific stressful situation. Paying specific attention to the situational context is therefore crucial to developing more complete occupational stress models.

### 1.1.4. Organizational Resources

So far, the stated alternatives for an expansion of job stress models referred to variables not exclusively related to the work setting. However, there might also be some components within the work domain that offer a valuable extension to the understanding of job stress. Whereas past research primarily focused on identifying potential harmful effects of the work environment on employee health, it might be useful to also look at potential beneficial effects that organizations can offer their employees to reduce the impact of job stress.

For example, a model originated in medical sociology provides several resources an organization can consider in order to counteract the negative influences of intensive job demands. Siegrist's (1996a) *Effort-Reward Imbalance Model* accounts for the potential of specific organizational rewards to balance the demands an organization requires from its employees. Studies in which organizations failed to provide adequate rewards reported an increase in health problems for the employees, including heart disease, physical health and depressive symptoms (Head, Stansfeld, & Siegrist, 2004; Kuper, Singh-Manoux, Siegrist, & Marmot, 2002; von dem Knesebeck & Siegrist, 2003). This shows the strong influence a functioning organizational reward system could have even on objective employee health outcomes and would be especially informative from the applied perspective to stimulate possible organizational intervention strategies. Thus, job stress research should also include potential resources that the work-environment (i.e., the organization or the supervisors) can provide.

### 1.1.5. Extended Occupational Stress Research

To summarize, occupational stress research should take into account some extension alternatives stated above for a deeper understanding of the process that leads to employees' decreased well-being. That includes to adapt job stress models to the actual context of employees brought on by the societal changes as well as to consider findings from other stress research areas. To set these new job stress models on a solid theoretical ground, job stress research should take advantage of some already developed basic stress models for deriving suitable hypotheses.

The present dissertation aimed at developing such new comprehensive job stress models that consider the unique situation of the respective employee. Following that aim, in the present dissertation, a specific job setting was selected in which the new perspectives on job stress could be applied consecutively. Within that job setting a sample has been selected representing a specific population of workers that were dealing with a unique job situation suitable for the development and analysis of comprehensive job stress models. Thus, the present study used Reservists as an exemplary model population, with their particular stress(or) constellation,

unique environmental and organizational conditions as well as relevant individual characteristics. Future studies may be able to transfer the present findings to their own population of interest with the respective relevant stressors according to their work environment and personal situation.

## 1.2. Reservists as an example of one specific occupational work sample

Reserve Components play a crucial role for military forces. In times of war the Reserve considerably augments the military manpower of a country. In Europe, the origin of the Reserve can be dated back into the year 1807. After the battle of Jena-Auerstedt, Napoleon forced the Prussian Army in the Treaty of Tilsit to drastically reduce its military strength. Through the reformation system of the Prussian Army, recruits were given a short period of training so that in time of war the capabilities of the military manpower could be considerably expanded (Wikipedia.org, 2006).

In the United States the Reserve has its origin in the year 1908 when a Bill passed by Congress authorized the Army to establish a Reserve Corps of medical officers. The Secretary of War could order these officers to active duty during time of emergency. This was the nation's first Federal Reserve. Finally, in 1912 the Regular Army Reserve was created that authorized a Federal Reserve outside the Medical Reserve Corps (GlobalSecurity.org, n.d.).

To have a better understanding of the dimensions the U.S. Army Reserve has today, consider that in 2002 the Reserve Components consisted of 1.2 million service members, which made up about 47% of the complete United States military force (Office of the Assistant Secretary of Defense for Reserve Affairs, 2002). At the end of the Cold War in the 1990's, the defense budget was reduced. Consequently, the active duty forces had to be downsized. At the same time, however, the mission demands and operational tempo did not decline. Thus, the Reserve Components were activated more frequently as a cost effective alternative to active duty military personnel. In fact, since Operation Desert Shield in 1990 the Reserve Components were no longer a strategic Reserve but became an operational Reserve that supported

day-to-day defense requirements. To express this in numbers: From 1989 to 2001 duty days of the Reserve Components increased from 1.4 million to 13 million (Office of the Assistant Secretary of Defense for Reserve Affairs, 2002). The reliance on military Reservists has an economic rationale: the Army saves over 2 million dollars when mobilizing 1,000 Reserve Soldiers compared to mobilizing Active Duty Soldiers (United States Army Reserve, n.d.).

The two primary U.S. Army subgroups of the Reserve Components are the Army Reserve and the Army National Guard. While the Army Reserve is completely controlled by the federal government, the Army National Guard can also be controlled by the state government when local emergencies occur. The Army Reserve is comprised of combat support and combat service support units. In addition to that, the Army National Guard also has combat arms units. This means that regarding the operational theatre, Reservists are facing the same job demands and encounter the same stressors as active duty Soldiers do. For example, 51% of the Army's Armored Battalions are in the National Guard and about 60,000 Army Guard personnel were deployed to the first Gulf War (The Army National Guard, n.d.).

However, there exists a difference between active duty Soldiers and the Reserves regarding their situation when they are not deployed. Reservists face a unique situation in the sense that they are citizen Soldiers. Wynd and Ryan-Wenger (1998) talked about the unique situation of the Reserve personnel as being "caught in that nebulous zone between the civilian world and the military culture" (p. 284). Reservists have their civilian lives and work in their civilian jobs, and yet they always need to be in a constant state of readiness. Usually, Reservists have one drill weekend each month and one annual training period of two weeks in the summer.

Nevertheless, not being a fulltime active Soldier also means having less military training and in turn may also mean Reservists are less prepared for their missions. Some researchers have dealt with the training issue in past studies (e.g., Dwyer, Oser, Salas, & Fowlkes, 2000; Wisher & Freeman, 2006) and have been concerned with the question of how to improve the existing military training for the Reserve Components to make them as equally well prepared for their duties as their active duty counterparts.

Other researchers have documented the stress exposures and stress outcomes of

reserve units. However, these researchers have not specifically accounted for the unique situation of Reservists but rather restricted their research to comparisons of deployed and non-deployed Reservists. Such studies have shown that activated Reserve Components report more distress than non deployed Reservists. For example, a study conducted by Perconte and colleagues (Perconte et al., 1993) showed that Reservists deployed to the Persian Gulf War had higher levels of psychiatric symptoms than Reservists who had not been deployed. In a longitudinal design, Stuart and Bliese (1998) found elevated levels of psychological distress among Reservists who had been deployed to the Gulf region during Operation Desert Storm in comparison to Reservists who were deployed to Germany or throughout the U.S., or who had not been deployed. Similarly, Holmes and colleagues (Holmes, Tariot, & Cox, 1998) found elevated Post Traumatic Stress Disorder (PTSD) symptoms among Reservists deployed to the Gulf War even though they did not experience traditional combat stressors and had high social support.

In other studies, researchers compared Reservists to active duty Soldiers and/or civilian samples. Their distinct findings for Reserve Soldiers in comparison to active duty Soldiers and civilians point toward the necessity of analyzing the unique situation of Reservists. For example, Stretch (1985) found elevated PTSD levels of Vietnam War Reservists in comparison to civilians. However, Reservists' PTSD symptoms were not as high as those of Vietnam War active duty Soldiers. Wynd and Dziedzicki (1992) compared anxiety levels of Army Reserve Nurses in comparison to their civilian coworkers in hospital settings and found heightened anxiety levels among Reservists due to concerns about potential family separation and financial issues that might come up if nurses were activated. This last finding indicates that Reservists can also experience psychological distress in the anticipation of a possible activation. Concerns about activation consequences for civilian life are definitely a unique issue for Reservists as they are constantly living in these two different spheres.

For Reservists, mobilization means an abrupt transition from daily routine to being an active Soldier. They need to be in a permanent state of readiness while fulfilling daily tasks for their civilian job and their family. Since the terrorist attacks on September 11th, 2001 the unpredictability of when and where the next terrorist attack might occur - and thus possible mobilization - has increased. Mobilization

means a rapid change in a Reservist's daily life. Not only does a Reservist need to deal with a different environment and task during the deployment, but there is also the awareness that the mobilization affects the life of loved ones who are left behind. The Reservist knows about the educational responsibilities within the family, the financial obligations, and the troubles the activation causes the civilian employer and colleagues who might need to somehow substitute for the absent coworker. This particular situation of the citizen Soldier needs to be considered (see also Perconte et al., 1993) when studying the stress perceptions and circumstances of reserve units.

Some researchers have started to analyze the unique stressors of Reservists and tried to place these stressors within a theoretical framework and identify the circumstances under which the negative impact of stressors on Reservists could be buffered (Bartone, 1999; Bliese & Stetz, in press).

In their study of activated Reservists, Bliese and Stetz (in press) integrated stressors of procedural justice, interpersonal conflict, and workload, into an occupational stress framework. These stressors were perceived to be critical factors during Reservists' mobilization for the following reasons: Activation time is very fast so that it leaves little time for Reservists to successfully adapt to this transition. Inconsistencies in the activation process (e.g., Reservists willing to deploy are not activated whereas Reservists unwilling to deploy are activated instead) affect perceptions of justice, which in turn were hypothesized to impede the adaptation process. Moreover, Reservists need to learn how to work with each other full time during the very stressful activation period, and this environment can lead to conflicts within the specific groups.

Furthermore, Bliese and Stetz (in press) found that under conditions of high procedural justice, self-efficacy buffered the impact of work stressors on job attitudes and well-being. Similarly, in his study of Persian Gulf War Reservists, Bartone (1999) detected hardiness as a significant individual difference variable associated with making Reservists more stress resistant, especially under high stress exposure. Consequently, the Bartone study does illustrate the importance and effectiveness of examining positive individual differences. Taken together, the Bliese and Stetz study and the Bartone study are the only two published reports located that specifically tested out models of Reservist occupational health. Findings from both of these

studies underscore the importance of taking individual differences into account.

However, besides personal resources that help individuals encounter job related stressors, research has also considered how the employees' organization can provide resources so that employees are able to better manage the encountered work stress. One important resource an employee should rely on is reciprocity. In psychological contract theory reciprocity refers to "the degree of agreement about the reciprocal exchange, given that commitments or contributions made by one party obligate the other to provide an appropriate return" (Dabos & Rousseau, 2004, p. 53). In case of Reservists it is important to consider the question what Reservists see as an adequate return for their commitment and contribution to their military job and what would be the consequences of an imbalance between contribution and returns. Several studies found that an imbalance of effort and reward on the job leads to decreased health and well-being of workers. As health risks, these studies have included coronary heart disease or cardiovascular risk factors (Kuper et al., 2002; Peter et al., 1998; Siegrist, 1996a, 1996b), alcohol dependence (Head et al., 2004), self reported physical and mental health (Godin, Kittel, Coppieters, & Siegrist, 2005; Kuper et al., 2002), and depressive symptoms (von dem Knesebeck & Siegrist, 2003; Watanabe, Irie, & Kobayashi, 2004). Thus, Reservists' health is likely to suffer if they don't experience an adequate compensation for enduring stressful conditions.

Therefore, considering the results of past research on Reservists, the present dissertation's purpose was to develop job stress models of Reservists while accounting for the unique aspects of these citizen Soldiers (i.e., civilian responsibilities concerning family, civilian employer/coworkers, and financial issues). In developing these models, the starting point were two established stress frameworks from different fields of psychology.

First, inspired by McEwen's (1998) model of *Allostatic Load*, a model from biological psychology, two assumptions were tested, focusing on the impact of pre-deployment chronic stressors (Study 1) and individual differences (Study 2) on Reservists' psychological health. Second, using Siegrist's (1996a, 1996b) occupational health model of *Effort-Reward Imbalance* (ERI), the focus was shifted towards Reservists' perception of their military work environment and the influence of reciprocity on Reservists' psychological health problems (Study 3).

# 2. Study 1: The Role of Chronic and Acute Job Stressors

Stimulated by McEwen's (1998; 2004) *Allostasic Load Model*, the aim of Study 1 was to understand the cumulative impact of potential chronic pre-deployment stressors and acute deployment stressors on Reservists' psychological health. The concept of *allostasis* was first introduced by Sterling and Eyer (1981). The term *allostasis* has a Greek origin and signifies maintaining stability through change (McEwen, 1998; McEwen & Lasley, 2004). In reference to a stress response, *allostasis* means that the human body reacts to stressful demands by initiating complex adaptation processes in order to cope with the new circumstances. Thus, stress responses are dynamic and flexible in nature. The allostatic reaction style is contrary to the originally acknowledged stress response theory introduced by Selye (1980), who proposed that as a reaction to stress, the body immediately tries to regain homeostasis, inferring that the body has a limited tolerance range for adaptation.

## 2.1. The Allostatic Load Model

McEwen (1998) further developed the concept of *allostasis* in his research and identified a large set of psychobiological mechanisms through which stressor influences on the body can lead to illness. McEwen (1998) formulated a stress model in which he proposes different pathways to decreased health and allostatic load (see Figure 2.1). On the one hand, there is the experience of trauma or abuse as well as major life events, which have the potential to activate the stress response. On the other hand, the model includes daily environmental stressors from work, home or the neighbor-

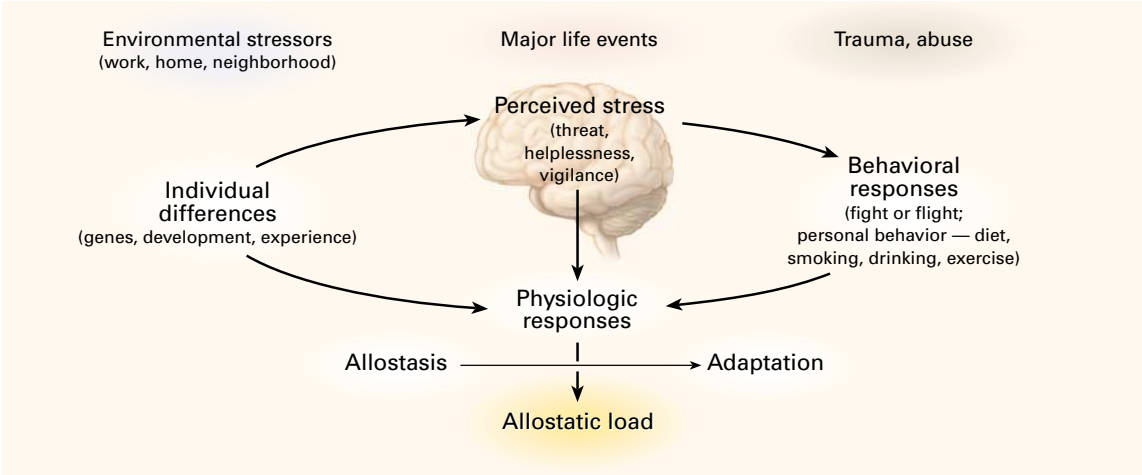


*Figure 2.1.* The *Allostatic Load Model*: The stress response and development of allostatic load (McEwen, 1998, p. 172).

hood responsible for the development of allostatic load. The focus of the present study lied on these daily stressors.

In general, when dealing with a stressor, the body initiates a complex adaptive response through activation of the hormonal system, as well as the sympathetic nervous system. This activation is normally turned off when the stressor or threat is over, which is the potential of *allostasis*. However, repeated activation of this adaptive response system (i.e., by chronic stressors) leads to *allostatic load* - a state in which the body is not able to balance out the reactions to stressors anymore (McEwen, 1998).

Thus, a first assumption that can be derived from the *Allostatic Load Model* is that allostatic load is a cumulative process over time, with chronic demands having more harmful effects than short-term stressors (G. W. Evans, 2003). This distinction is of specific relevance for the present study as during a deployment Reservists experience a large amount of acute stress situations while potentially already carrying with them chronic demands from their civilian life. Thus, even before their activation, Reservists have experienced environmental demands within their family or civilian employment due to their military job and therefore start their deployment

with a significant amount of stress burden. The distinction and specific influence of both types of stressors will be explained in more detail later (see subsection 2.2. "Distinguishing Chronic and Acute Stressors").

Allostatic load is usually assessed through a cumulative measure of several biological indicators of bodily changes in the different stress response systems. The concept of *allostatic load* as reported by McEwen (1998) has been validated in many different studies (e.g., Seeman, McEwen, Rowe, & Singer, 2001; Seeman, Singer, Ryff, Dienberg-Love, & Levy-Storms, 2002). On the way from allostasis to allostatic load there are primary mediators (i.e., cortisol, norepineprhine), which have widespread influences on the body. Thus, a deregulation of the primary mediators can lead to primary effects on specific receptors. In the long run, the malfunction will lead to secondary outcomes indicated, for example, by a change in waist-to-hip ratio, blood pressure or cholesterol. The actual illnesses or diseases are called "tertiary outcomes" (i.e., cardiovascular disease; McEwen & Seeman, 1999).

According to this response cascade, allostatic load represents the body's long-term wear and tear, which is caused by the mobilization of resources to meet environmental demands (G. W. Evans, 2003; McEwen, 1998). It is regarded as a marker of risk for decreased health and disease (e.g., Seeman et al., 2001). Consequently, allostatic load also leads to heightened vulnerability in the sense that individuals with a higher allostatic load burden due to prior environmental demands will - over time - become less efficient in turning off their stress response, continuing to put strain on their body's stability. Finally, elevated allostatic load will lead to illness and disease due to a deregulation of the stress response system.

Thus, a second assumption that can be derived from the *Allostatic Load Model* is that these complex changes in the stress response system are not simply affected by single environmental demands, but through responses to actual environmental demands modulated by prior experiences with stressors (additionally to genetic predespositions and lifestyle choices; G. W. Evans, 2003; McEwen, 1998; Seeman et al., 2001). Thus, it must be possible to identify an indicator representing a warning signal wich denotes that the bodily system might be close to be overloaded or is already overloaded. As a consequence for the design of the present study, this second assumption makes it necessary to assess the pre-existing stress burden of

Reservists before they go on deployment in order to have a premorbid indicator of elevated risk that can influence the Reservists' reactions to actual demands they potentially encounter on their deployment (see subsection 2.2.2. "Pre-Deployment Stress Burden").

Even though McEwen's *Allostatic Load Model* (1998) has normally been operationalized by biological markers of allostatic load, in choosing the outcome measures for the present study, the author focused on indicators of psychological health or disturbance based on self-rated symptoms of psychological health problems. If the accumulation of stress exposure has shown to influence biological markers of allostatic load, it might also be expected that this in turn can have an influence on the person's perceived psychological distress (G. W. Evans, 2003). In fact, even other research studies not only linked allostatic load to physical functioning, but also to cognitive functioning (Seeman et al., 2001), actual behavior (e.g., hostility; Kubzansky, Kawachi, & Sparrow, 1999) and psychological indicators like depression (G. W. Evans, 2003). The present study doesn't claim to assess allostatic load by the use of these psychological indicators as actual tertiary outcomes. The psychological self-report measures employed for the present study are rather proxies for the secondary outcomes, as they are not pretending to assess actual psychiatric caseness but rather initial symptoms of depression or general psychological distress.

## 2.2. Distinguishing Chronic and Acute Stressors

The *Allostatic Load Model* applies to all kinds of environments as it provides a general explanation about different pathways from stressors to decreased health and well-being. However, the present study restricted the model to its specific application in the job-related environment.

One specific advantage of using the *Allostatic Load Model* to understand Reservists' job stress issues is that McEwen considered the difference between chronic and acute stressors. This distinction is a valuable extension in comparison to occupational stress models reported so far in the literature (e.g., the Karasek Demand-Control Model; Karasek, 1979). Typically, job stress models developed so far only

focused on the actual job stressors an employee faces directly on the job. However, in general stress research both chronic and acute stressors were found to have an impact on long-term health outcomes (McEwen, 1998; McEwen & Lasley, 2004).

Researchers reported consistent results when it comes to the main effect of both types of stressors on health-related outcomes (Day & Livingstone, 2001; van der Ploeg et al., 2003). Yet, a clear distinction between chronic and acute stressors is difficult to achieve and has caused debate in the literature (Loughlin & Barling, 2000).

Since allostatic load is usually conceptualized through multiple indicators, in a study conducted by G. W. Evans (2003) the stressors leading to these complex changes in the organism's response system were also predicted through a cumulative measure of exposure to environmental demands. It was expected and found that elevated stress exposure leads to a higher allostatic load index. Similarly, the present study identified several chronic and acute stressors specifically important for the sample under study. These single stressors where then accumulated to form an overall construct of chronic and acute stressors, respectively. Based on a review of past research, for the purpose of the present study, two types of chronic stressors (i.e., civilian job and family concerns) and four types of acute stressors (i.e., organizational impediments, job unpredictability, interpersonal conflict, negative leadership behavior) have been identified as relevant constructs to consider when analyzing the job conditions of Reservists. For a better understanding of how the categories of chronic and acute stressors were operationalized in the present study, in the following sections each of the constructs for chronic and acute stressors is being explained in detail.

### 2.2.1. Chronic Stressors

Chronic stressors persist for a long period of time and function in the background of daily life (i.e., Sapolsky, 2004). One reason for the potential of chronic stressors to be effective even though they may not be present at a given moment is the human capacity of symbolic thought (McEwen & Lasley, 2004; Schneiderman, Ironson, & Siegel, 2005). Other than animals, human beings have a powerful mind that can keep

up a thought over a long period of time. The anticipation of a problem is enough to elicit a stress response, even though there is no real stressor present at the moment but just the imagination of it. Our imaginative capacity is sufficient to make it feel as if a stressor were real at the moment (McEwen & Lasley, 2004; Sapolsky, 2004). That way, chronic stressors don't even need to be actually persistent over a longer period of time, but they can be created by a person.

Chronic stressors in the present study are those stressors Reservists bring from their civilian world into the deployment and which resulted from the activation. Thus, separating chronic from acute stressors accounts for the unique situation of Reservists, who encounter acute stressors in their military life on deployment while possibly carrying with them chronic stressors regarding their civilian life back home.

Since Reservists are citizen Soldiers, besides their role in the military, as every other individual they are usually involved in numerous civilian life roles. These roles can be as a family member, as an employee and coworker or as a student, as a member within the local community or religious community and also as a friend during leisure time (Frone, 2003). Each of these civilian roles entails separate responsibilities. Problematic circumstances in one of these civilian roles may be a source of chronic stress for a Reservist who is activated. The present study particularly relied on two social roles outside the military job, namely the Reservist role within the family and within the civilian job for two reasons. First, the interest in the balance between work and family has a long research history and little research exists on the interplay of work with other social roles outside the family. Second, due to a well-documented change in society (see the introduction chapter of this dissertation) individuals are affected in both their family and work roles as well as their interrelation (Frone, 2003). The major impact of work life on the family applies specifically in the case of Reservists and may be an important source for chronic stress.

### Family Concerns

For example, Lakhani and Fugita (1993) found that unsupportive attitude of a spouse regarding the military affiliation of the Reservist made Reservists more likely to not reenlist. They suggested that increasing spouse support, for example through

military family participation programs or additional benefits would strengthen Reservists' intention to stay in the military. As the concern of a family member had an influence on an individual's willingness to remain in the Reserve Component, it could be argued that the presence of these family issues at pre-deployment are potential chronic stressors for Reservists during their deployment. In fact, in a survey conducted in November 2004, 47% of Reservists reported a current increase of stress level in their family life (Defense Manpower Data Center, 2005). About 35% of Reservists reported their spouse having an unfavorable view of their partner being in the Reserve Component. About 17% reported that their families have an unfavorable view of the participation in the Reserve Components.

Missing the support from a spouse during the activation and deployment phase for whatever reason can cause additional stress to Reservists. This is also in line with basic research on work-family balance that has linked higher levels of social support at home to lower family to work conflict (Frone, 2003). The activation is not only influencing Reservists' life but also the life of their loved ones. Leaving behind a spouse that is dependent on the partner might cause a difficult situation for the Reservist. This can also be seen from the Reserve Component survey, which revealed that the most frequently reported concern for activated Reservists were problems for the spouse left at home (Defense Manpower Data Center, 2005). An additional concern was the ability to communicate with the family while deployed. Thus, considering the problems caused for Reservists' families through the activation is important, when looking at the impact of Reservists' stress on their long-term health. During deployment the permanent thinking about potential problems a spouse might experience back home keeps up a Reservist's stress perception and thus functions as a chronic stressor.

### Civilian Job Problems

Another role a Reservist plays in civilian life besides in the family is in the civilian job. The majority of Reservists (77%) are carrying out a full time job in their civilian life (Defense Manpower Data Center, 2004). This civilian employment is also a source of chronic stress during a Reservist deployment. Among other worries,

Reservists reported reemployment issues after their deployment and reintegration in their civilian work role as being another major concern . This concern is emphasized by the fact that over 90% of surveyed Reservists whished to receive more information about the Uniformed Services Employment and Reemployment Rights Act (USERRA). This Act legally assures Reservists a prompt reemployment upon completion of their military service and prohibits any type of discrimination (Cady, 2003). However, about 15% of Reservists reported to already have experienced problems on their reemployment process with the civilian employer (Defense Manpower Data Center, 2004). Thus, a deployment that disrupts the civilian job life of Reservists may lead to negative effects upon their reemployment. Similarly to concerns about family related problems, Reservists may keep up worrying about their civilian reemployment. Rethinking and reactivating the potential reintegration problem thus can function as a chronic stressor.

Interestingly, research has also focused on potential beneficial effects of deployment on Reservists who are at risk for burnout from their civilian job (Etzion, Eden, & Lapidot, 1998). In the study by Etzion and colleagues, deployment is actually discussed as a special form of stress-relief that ameliorates the perception of job stressors and burnout after deactivation. However, the same researchers found that deriving beneficial effects from activation is closely related to the positive nature of the deployment experience as well as to the positive psychological detachment some Reservists experienced from the civilian job. That is, when Reservists experience a stressful deployment or keep thinking about their civilian job concerns during deployment the effects on burnout are even worse. Activated Reservists may encounter a harsh environment or experience a lot of traumatic or acute stressors during deployment, which adds to their civilian job stress. Similarly, activated Reservists may be unable to detach themselves from worries or concerns about their civilian job situation, knowing that an employer does not support service in the Reserve Components or knowing that coworkers suffer from additional demands in order to substitute for the Reservist.

Thus, the interaction between civilian job stressors and military stressors during deployment seems to be complex. Civilian job stressors, or stressors brought up by the deployment might not only negatively affect psychological health on the civilian

job but also on the military job. In addition to stressors perceived at the civilian job, a Reservist might also worry about the financial situation of the family during the deployment as the family now receives the military salary, which might be less than the salary of the civilian job. Equally worrying might be the thought of generally leaving the family behind, especially when the family or spouse is dependent on the Reservist.

### 2.2.2. Pre-Deployment Stress Burden

Regarding the potential stressors Reservist face because of their activation, Reservists might already start their deployment with a significant amount of psychological stress symptoms (i.e., depressive symptoms or general psychological health symptoms). If Reservists are not able to find satisfying solutions to their concerns in their civilian world, Reservists will carry this stress burden with them into the deployment, even before facing actual deployment stressors.

This pre-deployment stress burden can function as a premorbid indicator of Reservists' stress response system overload. Thus, pre-deployment stress burden may have an influence on post-deployment psychological health, such that stress burden mediates the relationship between chronic stressors at pre-deployment and post-deployment psychological health problems. In fact, there has already been a study on Reservists that indicated that stress symptoms mediate the relationship between exposure to stressful events at pre-deployment and post-deployment physical health (Norris, Maguen, Litz, Adler, & Britt, 2005).

To summarize, family-related difficulties, and civilian employment concerns are major chronic stressors whose effects have the capability to spill-over to the actual deployment, most probably through the influence of pre-deployment stress burden. Thus, taking into account the unique situation of citizen Soldiers, and applying the framework of allostatic load, the first hypothesis was stated as follows:

> *Hypothesis 1a*: Chronic stressors at pre-deployment (including civilian job problems, and spouse problems) have a negative impact on Reservists' psychological health problems at post-deployment (i.e., psychologi-

cal health symptoms and depressive symptoms) through the influence of pre-deployment stress burden.

### 2.2.3. Acute Stressors

Acute stressors do usually occur at a given moment and elicit the immediate stress response (i.e., Sapolsky, 2004). In the case of the present study, acute stressors are those stressors Reservists face while performing their daily military tasks during deployment (i.e., organizational impediments, job unpredictability, interpersonal conflict, negative leadership behavior).

As McEwen pointed out, chronic as well as acute stressors have an impact on long-term health (McEwen, 1998; McEwen & Lasley, 2004). During a deployment Soldiers are confronted with a myriad of different stressors, which may negatively influence Reservists' well-being. These activation-related stressors parallel many occupational stressors that have been identified in the literature.

#### Organizational Impediments

For example, among other stressors in the workplace, Jex (1998) identified organizational impediments as one of the key stressors employees face on their jobs. Organizational constraints are defined as any condition in an employee's immediate work environment that inhibits job performance (Peters & O'Connor, 1980). Not facilitating individuals' job performance means that an organization prevents an employee to translate job skills and abilities into actual performance and productive results. Possible constraints can be a lack of job-related information, required support, materials or supplies or required help from others. The reason for occurring organizational impediments may be located in the organizational procedures themselves or in unanticipated events that are often part in organizational life. The latter reason is closely related to another set of potential job stressors, namely job unpredictability.

### Job Unpredictability

Jex (1998) also identified job unpredictability as another key workplace stressor. Several studies have shown that an unpredictable job situation leads to decreased psychological well-being (Jex & Thomas, 2003; Tucker, Sinclair, & Thomas, 2005). In their *Transactional Stress Model* Lazarus and Folkman give a reason for why unpredictability or event uncertainty is a situational factor that influences the appraisal of a situation as being stressful (Lazarus & Folkman, 1984). On the one hand, predictable events allow the individual to perform anticipatory coping (*preparatory response hypothesis*). On the other hand, predictable situations imply that there is a time provided for the individual to relax (*safety signal hypothesis*). Thus, if individuals have to work in an unpredictable work environment they are left unprepared for potential stressful events. This can lead to a long process of appraisal and reappraisal generating conflicting thoughts, which can ultimately lead to feelings of helplessness and confusion.

### Interpersonal Conflict

Another relevant work stressor that has also been linked to reduced psychological well-being is interpersonal conflict (Jex, 1998; Jex & Thomas, 2003; Tucker et al., 2005). Conflict is an organizational stressor that can range from minor disagreements to verbal or even physical assaults (Spector & Jex, 1998). Especially in the case of Reservists, group or unit functioning can be a major issue. Reservists coming from different parts of the country may not have time to establish a cohesive working relationship with their unit (Wisher & Freeman, 2006). Moreover, Reservists need to learn how to effectively work with each other often under the stressful conditions of activation or deployment (Bliese & Stetz, in press). Thus, one important acute stressor for deployed Reservists which needs to be considered is interpersonal conflict.

### Negative Leadership Behavior

Additionally, in hierarchical organizations, not only are the negatively charged social interactions with peers potentially stressful, but also the interactions with military

leaders. Several studies have shown the importance of a supportive leadership and the negative effects of abusive supervision on measures of well-being (i.e., Seltzer & Numerof, 1988; Tepper, 2000; van Dierendonck, Haynes, Borrill, & Stride, 2004). In fact, negative leadership behavior has been recognized as a significant stressor reported by subordinates (Offermann & Hellmann, 1996). Tepper (2000) defines negative leadership behavior as abusive supervision, which is a subordinate's perception "of the extent to which supervisors engage in the sustained display of hostile verbal and nonverbal behaviors, excluding physical contact" (p. 178).

Thus, Reservists' acute stressors during deployment included in the present study were operationalized as organizational impediments, job unpredictability, interpersonal conflict, and negative leadership behavior. Including these acute stressors as indicators of the environmental stressor category in the *Allostatic Load Model*, the following was hypothesized:

> *Hypothesis 1b*: Acute stressors during deployment (i.e., organizational impediments, job unpredictability, interpersonal conflict, negative leadership behavior) have a negative impact on Reservists' psychological health problems at post-deployment (i.e., psychological health symptoms and depressive symptoms).

### 2.2.4. Interaction Effect of Chronic and Acute Stressors

Besides looking at the main effects of chronic and acute stressors, it is important to consider how these different stressors can interact with each other. Even though no path is directly illustrated in the *Allostatic Load Model* in Figure 2.1, the model predicts that individuals who suffer from chronic stressors are potentially more vulnerable when additionally being confronted with acute stressors, such that chronic stressors potentiate the impact of acute stressors (McEwen & Lasley, 2004). Accumulated stress over time is a challenge for the individual's stress response, which increases the risk of long-term morbidity. However, previous research has only partially confirmed this relationship. While some studies have supported the potentiating effect of chronic stressors on acute stressors, others have not.

In a study that supported the chronic-acute stressor link, Lepore and colleagues (Lepore, Miles, & Levy, 1997) found increased stress reactions when people suffered from chronic stressors. Similarly, Musante and colleagues (Musante et al., 2000) were able to show that the impact of stressful life events potentiated stress reactivity. Other researchers reported heightened cardiovascular activity during the experience of acute stressors, when individuals reported chronic stressors (i.e., Fleming, Baum, Davidson, Rectanus, & McArdle, 1987; Steptoe, Fieldman, & Evans, 1993). However, Roy, Steptoe, and Kirschbaum (1998) were not able to show a negative effect of prior life stressors on an acute laboratory stress task. There were also studies that found the opposite results, such that people reporting chronic stress showed reduced stress reactivity when confronted with an acute stressor (Matthews, Gump, & Owens, 2001). Musante et al. (2000) refer to this acute stress resistance as an inoculation effect of chronic stressors. The inoculation effect only occurs when an individual has been able to develop an adaptive coping response to the stressor and the stressor has ended, been resolved or avoided. If the chronic stressor is ongoing then there is a lack of inoculation, and the individual will respond to a new stressor with elevated levels of experienced stress (Matthews et al., 2001).

Taken together, the results of previous research suggested different possible relationships between acute stressors and chronic stressors. Given that the chronic stressors of Reservists in the present study were caused by the activation (civilian employment concerns, family concern) and thus were ongoing throughout the deployment, the inoculation effect observed with some chronic stressors in previous studies was not expected to occur. Instead, acute stressors should potentiate the negative effects of chronic stressors on post-deployment health. Reservists already bearing a high stress burden from pre-deployment should show less stress tolerance for acute stressors during deployment. Thus, consistent with the propositions of the *Allostatic Load Model* the following hypothesis was stated:

> *Hypothesis 1c*: Pre-deployment stress burden as an indicator of chronic stressors exacerbates the impact of deployment-related acute stressors on Reservists' psychological health problems at post-deployment (i.e., general psychological health symptoms and depressive symptoms).

### 2.2.5. Integrative Stress Model for Study 1

As the primary aim of the present study was to develop a job stress model for Reservists, the results of hypotheses 1a to 1c were integrated into a comprehensive job stress model (see Figure 2.2). The model included chronic stressors, which were faced by Reservists before deployment. These stressors were hypothesized to lead to pre-deployment stress burden, which had an impact on psychological health problems at post-deployment.

Additionally, acute stressors faced during deployment were identified to have an impact on post-deployment psychological health problems as well. Pre-deployment stress burden and acute stressors were expected to interact such that the most psychological health problems were experienced by those Reservists who had to deal with a large amount of deployment stressors and had already pre-existing stress burden.

A similar model has already been proposed and tested by King and colleagues (King, King, Foy, Keane, & Fairbank, 1999) in connection with developing an etiological model for PTSD in Vietnam veterans. King et al. also included pre-existing stressors (pre-war risk factors) when analyzing the impact of war-zone stressors on PTSD symptoms. This model demonstrated the applicability of each component in predicting military personnel health but with one key difference. Whereas King et al. analyzed the effects of traumatic stressors (i.e., combat exposure) the present study dealt with non-traumatic daily occupational hassles. Traumatic job stressors associated with combat exposure and harm may be similar for both active duty Soldiers and Reservists. However, when considering the context of a deployment, differences in deployment stressors emerge between Reservists and their active duty counterparts (Wisher & Freeman, 2006). Thus, it may be those "minor" occupational hassles that are worth considering as they make the difference in Soldier well-being on their everyday job duties.

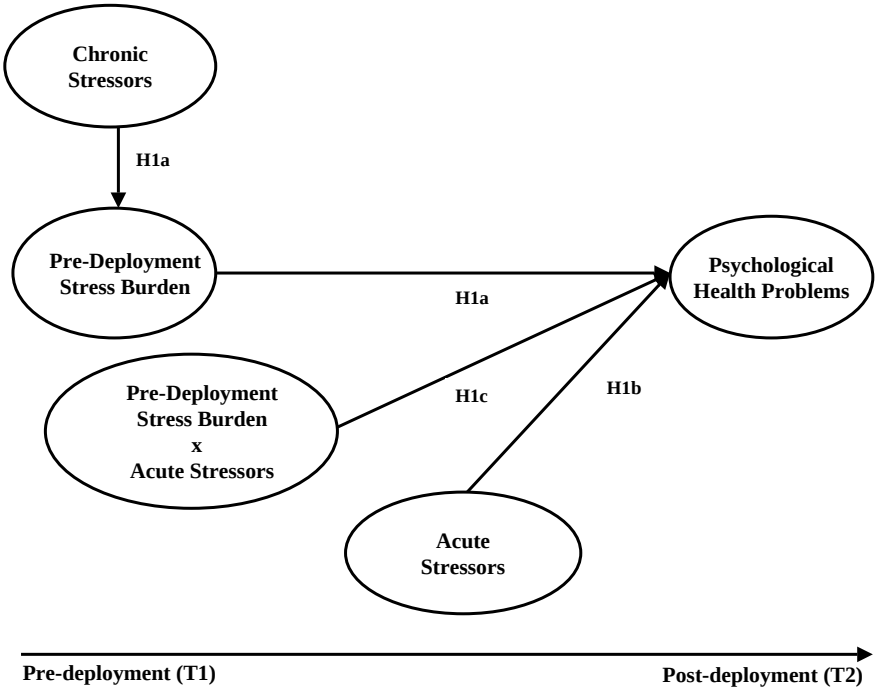


*Figure 2.2.* Proposed comprehensive job stress model, showing the impact of both unique chronic stressors and acute stressors (H1b), as well as mediator (H1a) and moderator (H1c) effects on psychological health problems. The mediation is represented by the link between chronic stressors and psychological health problems at post-deployment through pre-deployment stress burden. The moderation is represented by path H1c, the interaction of pre-deployment stress burden and acute stressors on psychological health problems at post-deployment.

## 2.3. Method

### 2.3.1. Participants

The sample of the present study consisted of 238 Reserve Component Soldiers who had both a civilian job and who were married in order to account for the chronic stressors available in the present study (98.2% National Guard, 0.4% Army Reserve, and 1.4% Active Guard Reserve). The majority of the sample was male (96.6%) with a mean age of 35 years (SD = 8.14). Most participants identified themselves as Caucasian (87.8%, vs. 7.6% as African American, 2.9% as Hispanic, and 1.7% as other) with the majority being enlisted Soldiers (95.3%, vs. 4.3% Commissioned Officers, and 0.4% Warrant Officers [1]).

### 2.3.2. Procedure

Data collection occurred for the first time in January 2002 (T1), approximately one month after the Reservists' mobilization. At that time Reservists were still in the U.S., preparing for their deployment to Europe. The second data collection occurred again in the U.S. in January of 2003 (T2). At that time Soldiers had already returned from their deployment and were being prepared for their transition back to civilian life. Thus, there has been a 12-month time period between the two data collection points, which gives the opportunity to analyze long-term stressor effects on psychological well-being of the Soldiers. All measures were assessed through surveys. All participants provided their informed consent and the surveys and procedures were part of a research protocol (Durand & Bliese, 2001) approved by the Human Use Review Committee of the Walter Reed Army Institute of Research [2].

[1] In the United States military, a Warrant Officer is a highly skilled, single-track specialty officer. The Army Warrant Officer thus is a technical expert, whose purpose is to serve in specific positions requirering specialized technical knowledge of complex systems An Army Warrant Officer gets an assignment to a position within a tightly focused field for longer periods of time. Warrant Officers make up approximately 2% of the Army and about 11% of the Officer Corps (Warrant Officers Heritage Foundation, n.d.).

[2] Additional information regarding the research protocol are available upon request by the principal investigators of the protocol.

### 2.3.3. Measures

*Chronic/Pre-Deployment Stressors* were assessed at T1. These civilian stressors included family related concerns, and concerns about the civilian job.

Family concerns were assessed using a three item measure of spouse dependence (Durand & Bliese, 2001) covering family, household and financial issues. Reservists rated their agreement on the items on a five point scale ranging from 1 = (*strongly agree*) to 5 (*strongly disagree*). The items were: *There is at least one person my spouse can go to for help when I am away*, *My family will have enough money to live on when I am deployed*, and *My spouse will be able to effectively manage the household when I am away.*

Reservists' concerns about the civilian job (Durand & Bliese, 2001) were assessed by asking participants to rate their agreement on three items covering Reservists' worries regarding the reemployment into their civilian job, their civilian employer support and the deployment's negative impact on their civilian coworkers. The items were as follows: *I am worried about whether my civilian job will actually be there when I am deactivated*, *My absence will negatively affect my co-workers in my civilian job*, *My employer supports my military affiliation.* The response scale ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). The last item was recoded such that a higher value also indicated greater concern.

Pre-deployment stress burden at T1 was assessed with Goldberg's (1972) 12-item version of the General Health Questionnaire (GHQ). Participants were asked to rate on a four-point scale (0 = *not at all*, 3 = *a lot more than usual*) how often they had experienced the given psychological symptoms in the past two weeks (e.g., *been able to concentrate on whatever you were doing*). All the items were re-coded in the same direction and a mean scale score was derived such that higher scores indicated more health problems. The GHQ-12 is a well-established instrument for minor psychiatric disorders. As a self–rated health measure, the GHQ-12 has proven to be a clinically significant scale in various studies (Kivimäki, Elovainio, Vahtera, & Ferrie, 2003). The short version of the GHQ has been thoroughly validated (Goldberg et al., 1997).

As another indicator of pre-deployment stress burden the short version of the Personal Health Questionnaire (PHQ) was used (Kroenke, Spitzer, & Williams, 2001).

The PHQ-9 asks respondents to indicate how often they had been bothered by symptoms of depression like: *Lost interest or pleasure in doing things.* The response options ranged from 1 = *not at all* to 4 = *nearly every day.* Validity studies of the PHQ-9 have shown the measure to have good sensitivity and specificity (Kroenke et al., 2001).

*Acute/Deployment Stressors*: Four different measures were used for the operationalization of acute work-related stressors at T2. The first measure was organizational impediments by Spector and Jex (1998), which was adapted for this study. The scale contained ten items in which participants were asked to indicate how often they found it difficult or impossible to do their military job in Europe because of several reasons (e.g., *conflicting job demands*) on a five-item response scale (1 = *less than once a month or never* to 5 = *several times a day*).

The second deployment stressor was job unpredictability (Castro & Adler, 2001). The six-item measure applies to all military settings and asks Soldiers to state their agreement on a five-point scale (1 = *strongly agree*, 5 = *strongly disagree*) on items like: *I knew what duty I would be doing day to day* or *Most of my tasks were clearly defined.*

The third measure of deployment stressors was interpersonal conflict (Spector & Jex, 1998). On a five-item response scale (1 = *never*, 5 = *very often*) Reservists were asked to indicate how often people in their company had one of four stated incidents (*get into arguments with each other*, *yelling at each other*, *be rude to each other*, or *do bad things to each other*).

Finally, negative leadership behavior of the company commander and the 1st Sergeant (1SGT) was assessed with five items each from the leadership behavior scale adopted for this study (House, Hanges, Javidan, Dorfman, & Gupta, 2004). Reservists were asked to rate on a five-point scale (1 = *strongly disagree*, 5 = *strongly agree*) how much they agreed on negative behaviors of their company commander and 1SGT. Sample items were: *My company commander was bossy* or *My 1SGT was dictorial.*

*Psychological Health Outcomes*: The measure for psychological health symptoms at T2 was again the 12-item version of the GHQ (Goldberg, 1972). Additionally, depressive symptoms were assessed with the nine-item Personal Health Questionnaire

*Table 2.1.* Measures in Study 1

| Scales | Items | Reference |
|---|---|---|
| **Chronic/Civilian Stressors T1** | | |
| Reemployment Concerns | 1 | Durand and Bliese (2001) |
| Employer Non-Support | 1 | Durand and Bliese (2001) |
| Negative Coworker Impact | 1 | Durand and Bliese (2001) |
| Spouse Dependence | 3 | Durand and Bliese (2001) |
| **Pre-Deployment Stress Burden T1** | | |
| General Health Questionnaire | 12 | Goldberg (1972) |
| Personal Health Questionnaire | 9 | Kroenke et al. (2001) |
| **Acute/Deployment Stressors T2** | | |
| Organizational Impediments | 10 | Spector and Jex (1998) |
| Job Unpredictability | 6 | Castro and Adler (2001) |
| Interpersonal Conflict | 4 | Spector and Jex (1998) |
| Negative Commander Behavior | 5 | House et al. (2004) |
| Negative 1st Sergeant Behavior | 5 | House et al. (2004) |
| **Outcomes: Psychological Health Problems T2** | | |
| General Health Questionnaire | 12 | Goldberg (1972) |
| Personal Health Questionnaire | 9 | Kroenke et al. (2001) |

(PHQ-9; Kroenke et al., 2001). Table 2.1 provides a summary of all scales used in Study 1.

### 2.3.4. Analytic Strategy

The integrative model in the present Study 1 was analyzed by using a Structural Equation Modeling (SEM) approach, which considered mediation as well as moderation effects as discussed with Figure 2.2. All analyses were conducted using maximum likelihood estimation and LISREL 8.30 (Jöreskog & Sörbom, 1999).

In addition to the standard SEM-procedure to test for mediation effects, which is

comparing the mediation model with a model including the additional direct path from the predictor variable to the outcome variable, in the present study the mediation hypothesis 1a was also directly tested using Sobel's (1982) first order solution test. This method examines the effect of the intervening variable through the product of the coefficients ($\alpha\beta$), also considering the coefficients' standard errors (see below formula for Sobel's test of the intervening variable significance). MacKinnon, Lockwood, Hoffman, West, and Sheets (2002) have shown this method to have a greater power than the commonly used mediation testing by Baron and Kenny (1986).

$$z = \frac{\alpha\beta}{\sqrt{\alpha^2\sigma_\beta^2 + \beta^2\sigma_\alpha^2}}$$

While mediation analyses are quite common in SEM, typically in most psychological research moderation analyses are not conducted with SEM-approaches. The reason why previous studies did not conduct latent interactions with SEM is because many SEM-moderation approaches are difficult to interpret or require specialized software. In the present study, a newly developed unconstrained approach for model estimations with latent interactions was used (Marsh, Wen, & Hau, 2004). According to Marsh and colleagues a latent factor interaction is constructed by matching the different indicators of the two separate latent variables as combined indicators of the latent interaction. This approach is more intuitive than other SEM-moderation approaches and facilitates easy measurement model interpretation. Furthermore, Marsh and his colleagues found in simulation studies that this unconstraint approach is also statistically adequate for most SEM models and has several advantages over previously proposed SEM techniques when analyzing latent interactions. The statistical advantages regard acceptable Type I error rates and unbiased estimation even when assumptions of indicator normality were violated.

In the present study SEM-analyses were conducted using a two-step approach typically recommended in the SEM-literature (e.g., Anderson & Gerbing, 1988). As a first step, the measurement model of the latent variables was assessed. Additionally, all independent variables were z-standardized prior to entering them in the SEM-

analyses in order to prevent multicollinearity and facilitate model estimation due to the hypothesized moderation effects in the structural model (Aiken & West, 1991). As the values of the outcome measures did not have a relevant value by themselves (e.g., like money or temperature would have), they were also standardized for easier model interpretation. As the second step, the structural model was examined including moderation and mediation effects.

For the overall model evaluation Kline's (1998) recommendations of reporting multiple goodness-of-fit indicators were followed. Kline advised researchers to report four different indices. First, researchers should report Bentler's (1989, 1990) Comparative Fit Index (CFI) as an index of variance accounted for by the model. The CFI is also recommended by Hu and Bentler (1998) as they found in their simulation study that the CFI was very sensitive to complex model misspecification in SEM estimated by maximum likelihood estimation procedures. Second, Kline suggested Bentler and Bonnett (1980) Non-Normed Fit Index (NNFI) as an adjusted index for model complexity. Third, Kline proposed to consider the Standard Root-Mean Square Residual (SRMR) (Bentler, 1995; Jöreskog & Sörbom, 1981). Also Hu and Bentler (1998) recommended reporting the SRMR as it is a sensitive fit statistic for simple model misspecification. Finally, as the $\chi^2$ statistic is sensitive to sample sizes, Kline recommends reporting the ratio of the $\chi^2$ value to its degrees of freedom. According to Kline a good model fit would be achieved when CFI and NNFI are greater than .90, SRMR is smaller than .10 and the $\chi^2$ /df ratio is smaller than 3.

## 2.4. Results

### 2.4.1. Descriptive Statistics

Means, standard deviations and reliabilities of all study variables are provided in Table 2.2. Please note that the relatively low mean values especially of the health variables were due to the model population under study. They were a healthy sample, physically fit, of relatively young age, and trained for the deployment. Additionally, Reservists in the present sample were deployed to Europe and not to a combat zone. Thus, these Reservists were not representative for the general population.

*Table 2.2.* Means, Standard Deviations and Cronbach's $\alpha$ of Variables in Study 1

| Variable | Mean | SD | $\alpha$ |
|---|---|---|---|
| **Chronic/Civilian Stressors T1** | | | |
| Reemployment Concern | 2.34 | 1.11 | - |
| Employer Non-Support | 2.17 | 0.96 | - |
| Negative Coworker Impact | 3.09 | 1.03 | - |
| Spouse Dependence | 1.66 | 0.67 | .72 |
| **Pre-Deployment Stress Burden T1** | | | |
| Psychological Health Symptoms | 1.21 | 0.35 | .71 |
| Depressive Symptoms | 1.29 | 0.41 | .88 |
| **Acute/Deployment Stressors T2** | | | |
| Organizational Impediments | 2.15 | 0.98 | .93 |
| Job Unpredictability | 2.13 | 0.64 | .81 |
| Interpersonal Conflict | 2.96 | 0.90 | .93 |
| Negative Commander Behavior | 2.72 | 0.92 | .88 |
| Negative 1st Sergeant Behavior | 2.62 | 0.95 | .90 |
| **Outcomes: Psychological Health Problems T2** | | | |
| Psychological Health Symptoms | 1.30 | 0.34 | .74 |
| Depressive Symptoms | 1.28 | 0.47 | .90 |

*Note.* Measures with missing reliabilities are one-item measures

Correlations between study variables are provided in Table 2.3. An increased amount of chronic or acute stressors is generally related to an increased amount of depressive symptoms and general psychological health symptoms at pre- or post-deployment, respectively.

As the chronic stressors in the present study were operationalized by family concerns and civilian job problems only those Reservists could be included who – at the time of activation – reported to be married and to also be employed in a civilian job. However, these chronic stressors are to be understood as functioning like an example

*Table 2.3.* Correlations of Variables in Study 1

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Reemployment Concern T1 | - | | | | | | | | | | | |
| 2. Employer Non-Support T1 | .39 | - | | | | | | | | | | |
| 3. Negative Coworker Impact T1 | .27 | .11 | - | | | | | | | | | |
| 4. Spouse Dependence T1 | .25 | .12 | .11 | - | | | | | | | | |
| 5. Psychological Health Symptoms T1 | .20 | .13 | .14 | .17 | - | | | | | | | |
| 6. Depressive Symptoms T1 | .14 | .09 | .06 | .18 | .46 | - | | | | | | |
| 7. Organizational Impediments T2 | .12 | .05 | .11 | .16 | .13 | .23 | - | | | | | |
| 8. Job Unpredictability T2 | .05 | -.01 | .03 | .10 | .12 | .09 | .39 | - | | | | |
| 9. Interpersonal Conflict T2 | .03 | -.02 | -.10 | .12 | .08 | .16 | .47 | -.24 | - | | | |
| 10. Negative Commander Behavior T2 | .12 | .04 | .02 | .00 | .08 | .04 | .10 | .28 | .16 | - | | |
| 11. Negative 1st Sergeant Behavior T2 | .09 | -.04 | -.03 | -.04 | .04 | .04 | .01 | .23 | .09 | .48 | - | |
| 12. Psychological Health Symptoms T2 | .22 | .13 | .10 | .16 | .19 | .28 | .16 | .20 | .19 | .07 | .22 | - |
| 13. Depressive Symptoms T2 | .14 | .11 | .09 | .23 | .22 | .48 | .31 | .18 | .16 | .12 | .16 | .47 |

*Note.* Critical values: $p < .05$ at $|r| = .13$ for two-sided tests;
$p < .01$ at $|r| = .17$ for two-sided tests.

of several other potential chronic stressors that could be occuring when activating a Reservist. Of course, there are many other possible chronic stressors that could affect a person during mobilization. For example, some Reservists may have been enrolled in a university program and needed to interrupt their studies, which may have caused them concerns regarding missed exams or job opportunities, or loosing friends from their courses that now would graduate a year earlier. Some Reservists were not married but were living together with their partners in a stable relationship and thus had the same concerns as married Reservists. However, these Reservists would not fill out the survey questions regarding the information on spouses. Additionally, one can imagine a set of different aspects in civilian life - even personal hobbies - that an activation would require to give up and as a result would lead to feelings of discomfort in Reservists.

In order to make sure that the chronic stressors selected for the present study were only exemplary of a range of other possible chronic stressors and that the selected subsample of married and employed Reservists was not unique in its perception and reporting of stressors and health problems, additional descriptive analyses were conducted. The following histograms (see Figures 2.3 to 2.7) graphed the distributions of acute deployment stressors (Figure 2.3), pre-deployment stress burden (Figure 2.4 and 2.5) and post-deployment psychological health problems (Figure 2.6 and 2.7), comparing the married and employed subsample under study with the remaining sample of either not married and/or not employed Reservists.

As can be seen from the *t-test* results reported in the Figure captions, the mean differences of the two subsamples on the different variables were not significant in any case. In general, employed and married Reservists reported to have experienced the same amount of acute deployment stressors as Reservists who were not married or not employed. Also regarding their pre-deployment stress burden, married and employed Reservists were not at a different level of burden, due to their respective civilian life situation. Similarly, after deployment the two subsamples were not at different levels regarding their post-deployment health problems. Thus, the subsample under study was understood as an exemplary group of people with their specific chronic stressors. For future studies, the chronic stressors in the model could be replaced according to the specific situation of each individual sample.

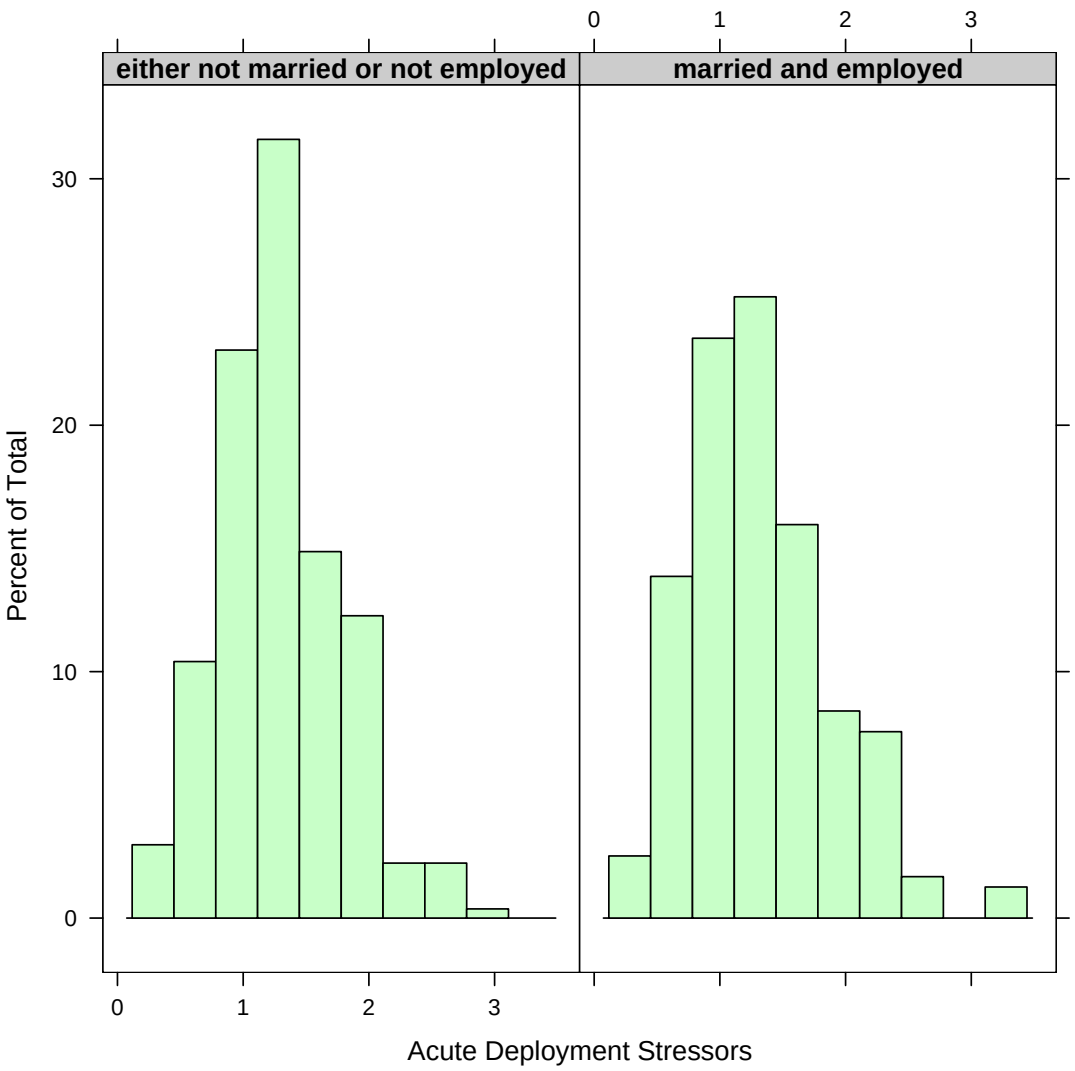


*Figure 2.3.* Histogram comparing the mean frequencies of reported acute deployment stressors for the subsample under study ($M_1$ for married and employed Reservists) vs. the remaining sample ($M_0$ for either not married or not employed Reservists). The mean difference was not significant ($M_0 = 1.29$, $SD_0 = 0.49$; $M_1 = 1.32$, $SD_1 = 0.55$; $t = -0.56$, $p = .57$).

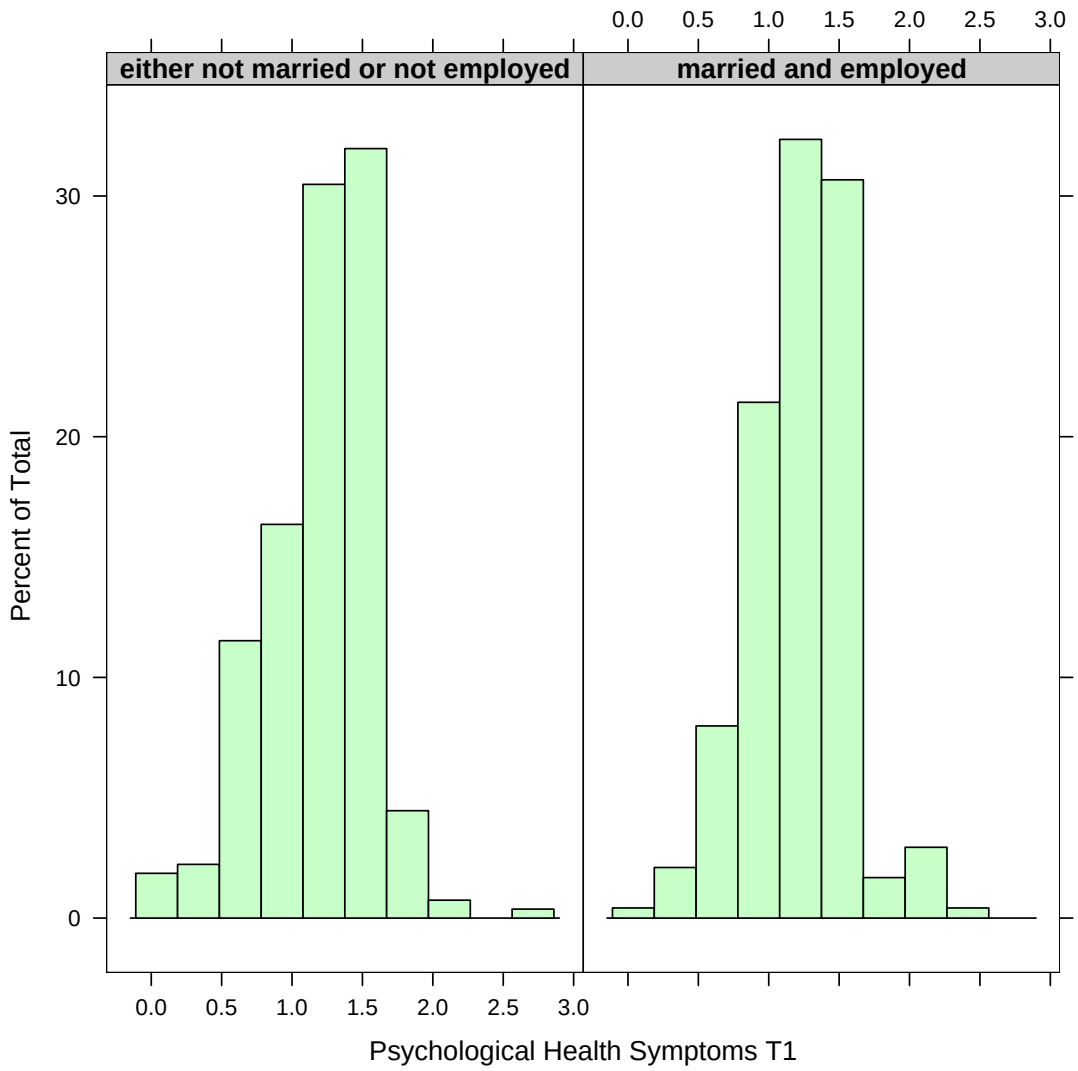


*Figure 2.4.* Histogram comparing the mean frequencies of reported pre-deployment psychological health symptoms for the subsample under study ($M_1$ for married and employed Reservists) vs. the remaining sample ($M_0$ for either not married or not employed Reservists). The mean difference was not significant ($M_0 = 1.20$, $SD_0 = 0.39$; $M_1 = 1.21$, $SD_1 = 0.35$; $t = -0.30$, $p = .77$).

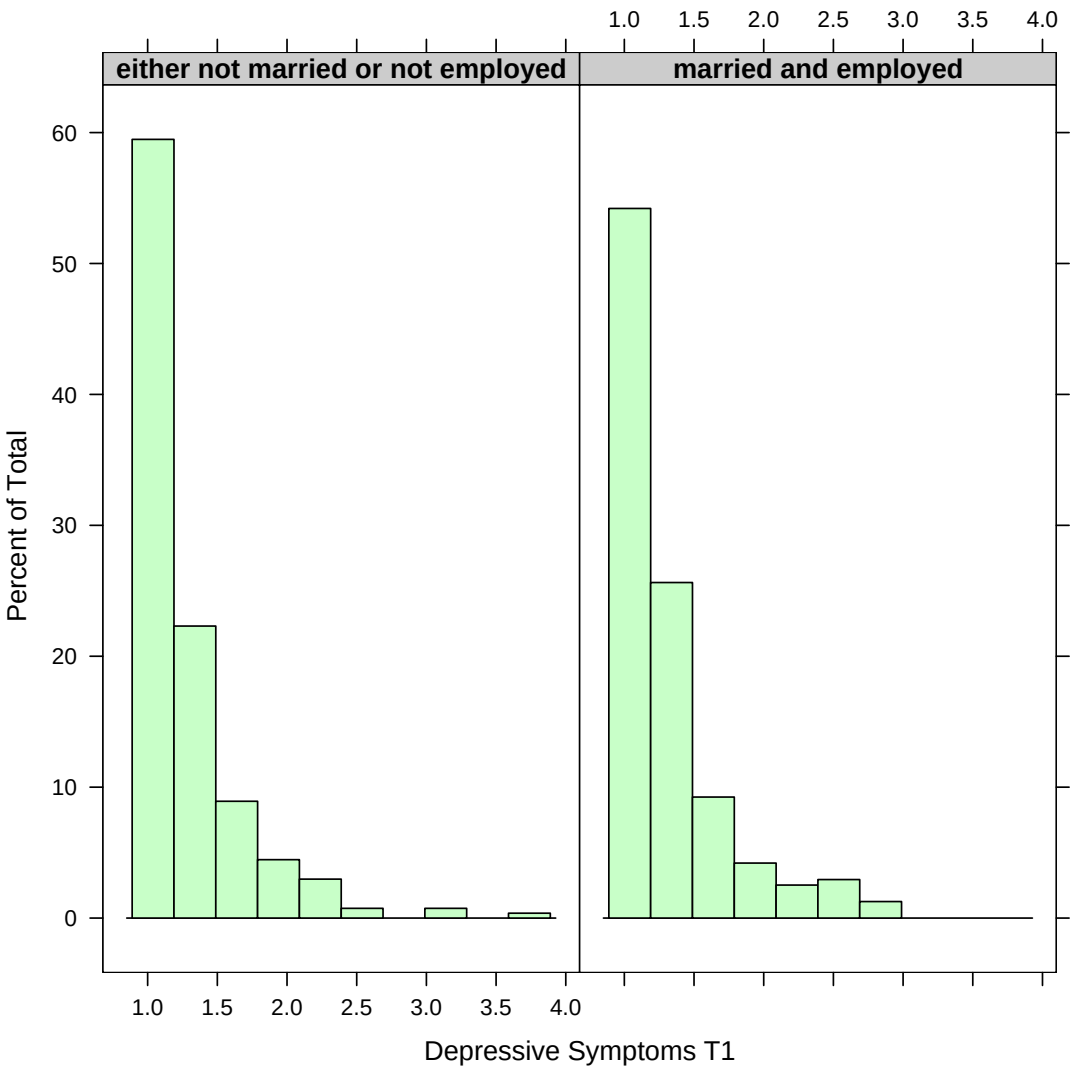


*Figure 2.5.* Histogram comparing the mean frequencies of reported pre-deployment depressive symptoms for the subsample under study ($M_1$ for married and employed Reservists) vs. the remaining sample ($M_0$ for either not married or not employed Reservists). The mean difference was not significant ($M_0 = 1.26$, $SD_0 = 0.40$; $M_1 = 1.29$, $SD_1 = 0.41$; $t = -0.79$, $p = .43$).

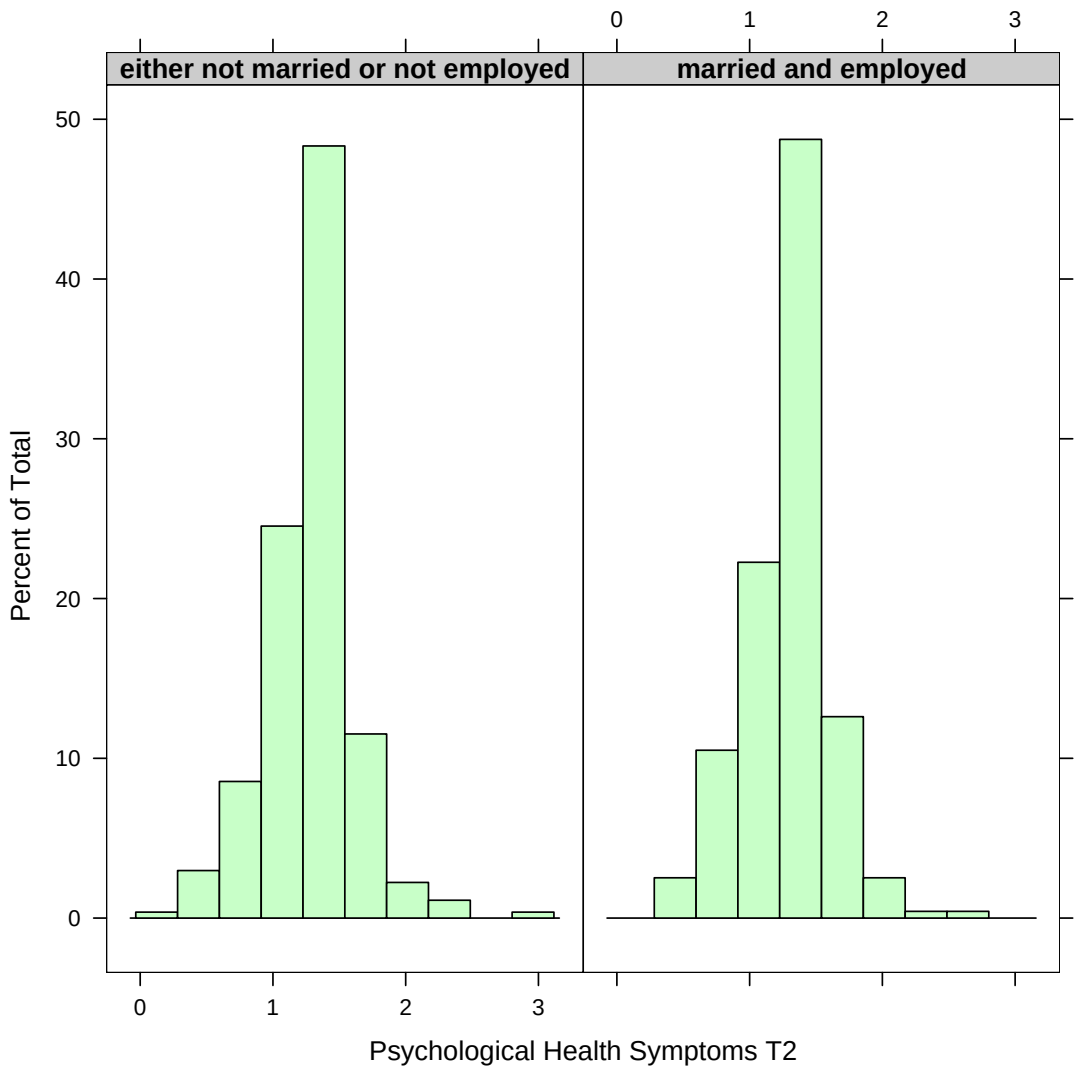


*Figure 2.6.* Histogram comparing the mean frequencies of reported post-deployment psychological health symptoms for the subsample under study ($M_1$ for married and employed Reservists) vs. the remaining sample ($M_0$ for either not married or not employed Reservists). The mean difference was not significant ($M_0 = 1.29$, $SD_0 = 0.35$; $M_1 = 1.30$, $SD_1 = 0.34$; $t = -0.30$, $p = .77$).

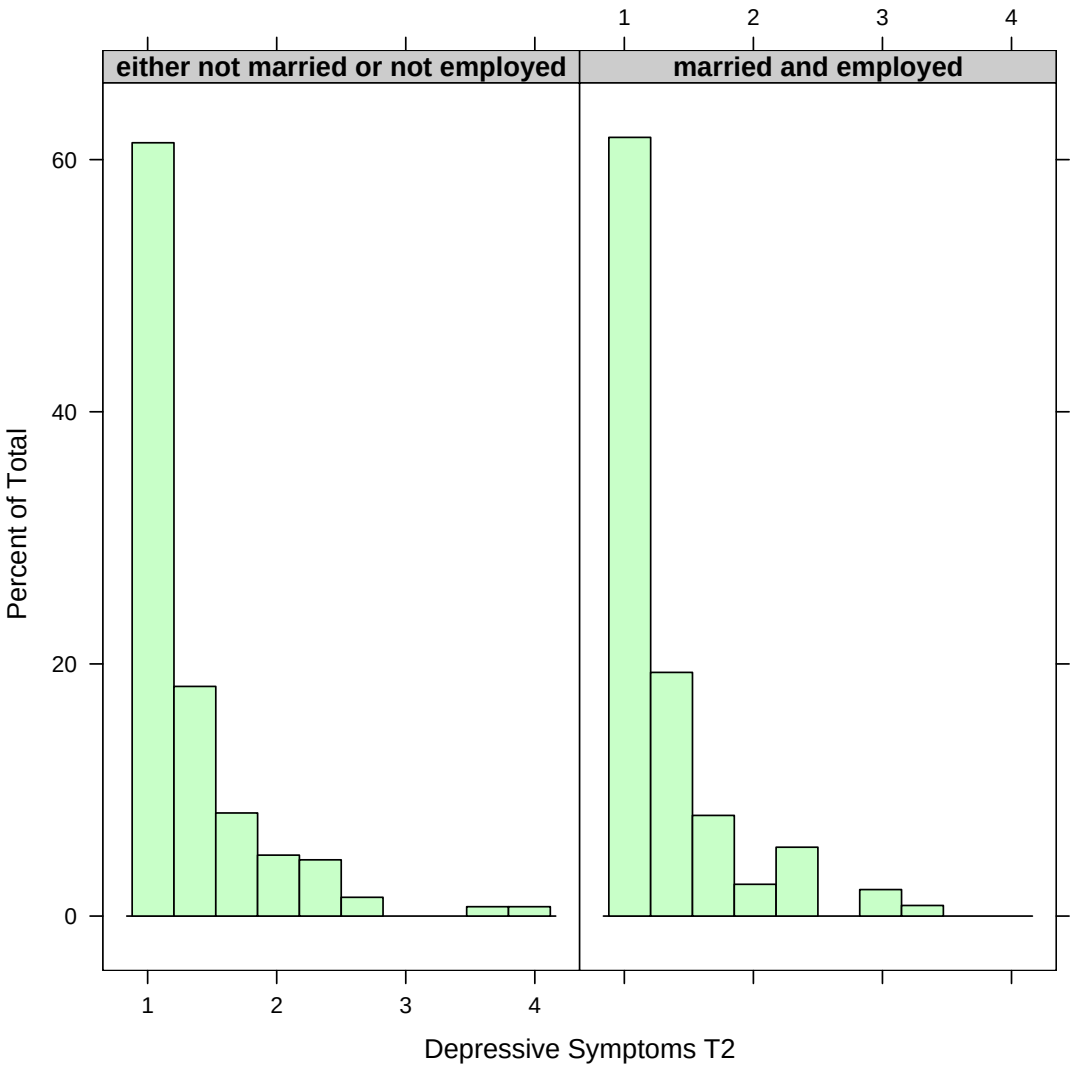


*Figure 2.7.* Histogram comparing the mean frequencies of reported post-deployment depressive symptoms for the subsample under study ($M_1$ for married and employed Reservists) vs. the remaining sample ($M_0$ for either not married or not employed Reservists). The mean difference was not significant ($M_0 = 1.29$, $SD_0 = 0.51$; $M_1 = 1.28$, $SD_1 = 0.47$; $t = 0.34$, $p = .74$).

### 2.4.2. Measurement Model

Before testing the actual prediction model, first the measurement model was analyzed. The model included five latent constructs representing chronic civilian pre-deployment stressors, stress burden at pre-deployment, acute deployment stressors, post-deployment health problems and the interaction of the pre-deployment stress burden and acute stressors during deployment (Figure 2.8).

The latent construct of chronic stressors was represented by four manifest variables including family concerns due to spouse dependence, and three one-item measures representing concerns about the civilian job, namely reemployment concerns, perceived employer non-support and perceived negative impact on the coworker due to the Reservist's activation. Thus, the latent variable of chronic stressors represented the major ongoing concerns of Reservists during deployment that were caused within their civilian work and family life due to their activation.

The latent construct of acute stressors was assessed with five manifest variables, namely organizational impediments, job unpredictability, interpersonal conflict, negative leadership behavior of the commander and the 1st Sergeant. Thus, the latent variable of acute stressors represented the major demands and work-related difficulties Reservists encountered in performing their military mission abroad.

The latent construct of pre-deployment stress burden was comprised of two manifest variables, measured at T1. These variables were reported pre-deployment psychological health symptoms and depressive symptoms at pre-deployment. Thus, the latent variable of pre-deployment stress burden represented the psychological state under which the Reservists went into their deployment.

Similarly, the latent construct of post-deployment health problems was assessed with the two manifest variables of post-deployment psychological health symptoms and depressive symptoms. Thus, this latent construct of post-deployment psychological health problems represented the psychological state under which the Reservists came out of their deployment.

Following the unconstrained approach suggested by Marsh et al. (2004) the latent construct of the interaction term between pre-deployment stress burden and deployment stressors was built by using all five manifest indicators of the acute stressors

construct combined with either one of the two manifest indicators of pre-deployment stress burden (see Figure 2.8). The procedure of reusing the indicator information of the pre-deployment stress burden construct was necessary because there was not the possibility of matched pairs as would have been required (Marsh et al., 2004). However, it was seen as more important not to loose any available information from the model for the latent interaction construct.

The five constructs were all allowed to freely intercorrelate so that model fit indices reflected the adequacy of the proposed relationships between the latent constructs and their manifest indicators. The measurement model also included a small number of covariances among the deployment stressors subscale residuals, which were suggested by modification indices and also made conceptual sense. For example, the scales assessing negative commander and 1SGT leadership behavior were comprised of the same items. Only the leader position was exchanged. Similarly, when looking at some items of organizational impediments, they included statements that also could imply interpersonal conflict (e.g., inadequate help from others, interruptions by other people). Furthermore, some items for organizational impediments included statements that were related to leadership (e.g., lack of necessary information about what to do or how to do it). The fit of the measurement model was good, $\chi^2$ (df = 122, N = 238) 138.97, $p$ = .14, $\chi^2$ /df = 1.14, SRMR = .05, CFI = .96, NNFI = .95. All loadings of the measured variables on their respective constructs were statistically significant (Figure 2.8). Table 2.4 provides the correlation among the latent constructs from the measurement model.

### 2.4.3. Structural Equation Models

As the measurement model has been confirmed, the second step in the analysis required the estimation of the structural model that integrated Reservist-specific civilian pre-deployment stressors as well as acute deployment stressors. The model proposed a mediation effect of pre-deployment stress burden on the relationship between chronic civilian stressors and psychological health problems (hypothesis 1a) a direct path from acute deployment stressors to psychological health problems (hypothesis 1b) as well as a moderation effect of acute deployment stressors on the

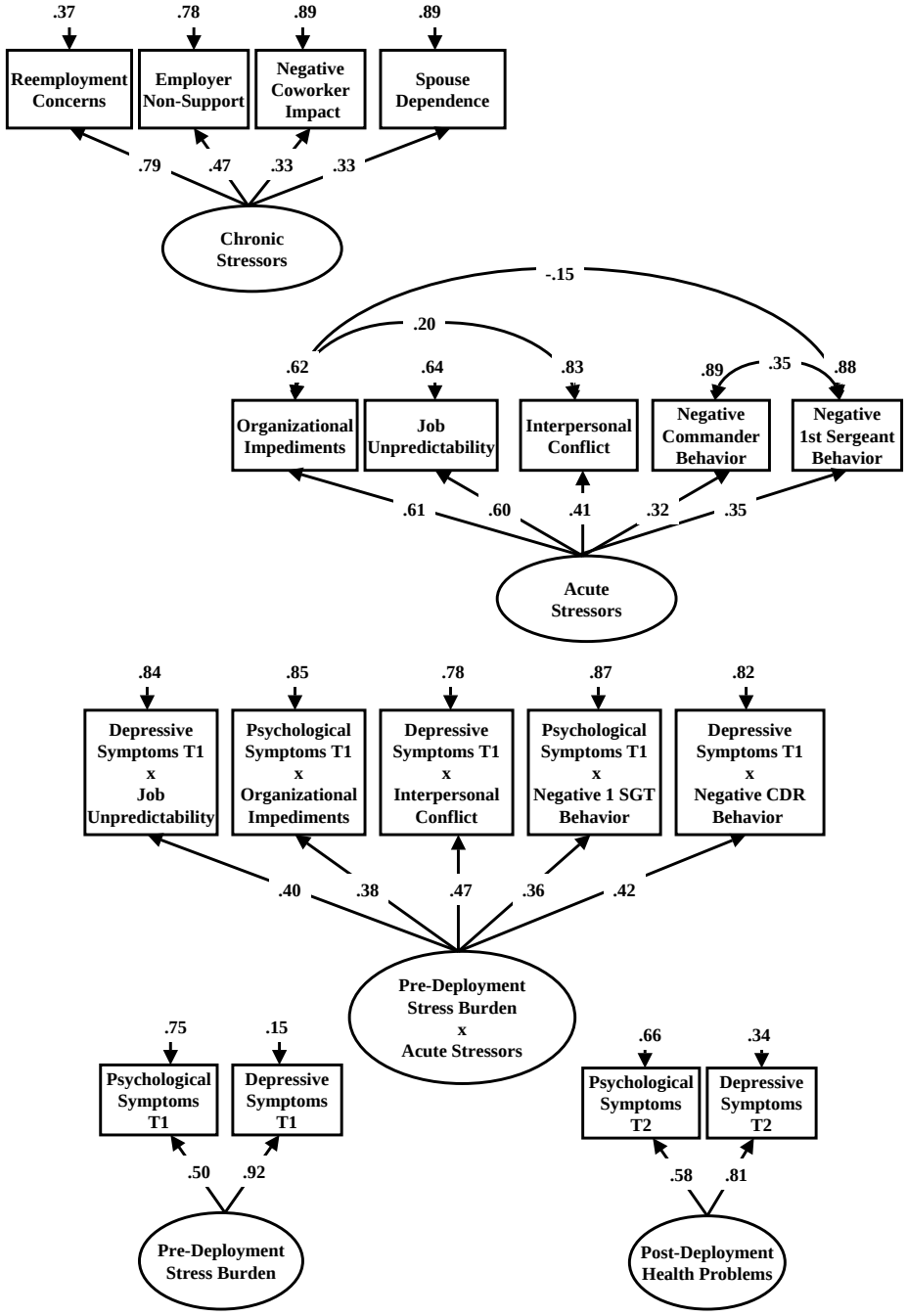


*Figure 2.8.* Measurement model of Study 1 with standardized path coefficients. For clarity of presentation, latent factor correlations are not illustrated (see Table 2.4.).

*Table 2.4.* Correlations of Latent Variables of Study 1

| Variable | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. Chronic/Civilian Stressors T1 | – | | | |
| 2. Pre-Deployment Stress Burden T1 | .23 | – | | |
| 3. Acute/Deployment Stressors T2 | .20 | .28 | – | |
| 4. Stress Burden × Deployment Stressors | .11 | .44 | .03 | – |
| 5. Post-Deployment Health Problems T2 | .32 | .62 | .53 | .43 |

*Note.* Critical values: $p < .05$ at $|r| = .13$ for two-sided tests; $p < .01$ at $|r| = .17$ for two-sided tests.

relationship of pre-deployment stress burden and post-deployment health problems (hypothesis 1c). The structural model and its standardized parameter estimates are shown in Figure 2.9. Fit indices resulting for this model suggested that it fitted the data quite well, $\chi^2$ (df = 125; N = 238) 163.26, $p = .01$, $\chi^2$ /df = 1.31, SRMR = .06, CFI = .92, NNFI = .90. All hypothesized paths were statistically significant supporting hypothesis 1 b and 1 c. Overall the hypothesized structure model explained over 50% of Reservists post-deployment health problems ($R^2 = .57$).

The interaction effect of the two latent predictor variables of acute deployment stressors and pre-deployment stress burden is presented in Figure 2.10. In correspondence with hypothesis 1c, those Reservists who reported experiencing many deployment stressors as well as pre-deployment stress burden also reported the worst health problems at post-deployment.

To test for the mediation effect of pre-deployment stress burden on the relationship between chronic civilian stressors and post-deployment health, a direct path from the predictor variable (chronic civilian pre-deployment stressors) to the outcome measure (health problems) was added. This model is shown in Figure 2.11 and resulted in the following fit indices, $\chi^2$(df = 124; N = 238) 162.12, $p = .01$, $\chi^2$ /df = 1.31, SRMR = .06, CFI = .92, NNFI = .90. The direct path from the predictor to the outcome variable is indicated with a dotted line, as it was not significant.

Using the $\chi^2$ –test, it was compared whether the model including the direct path

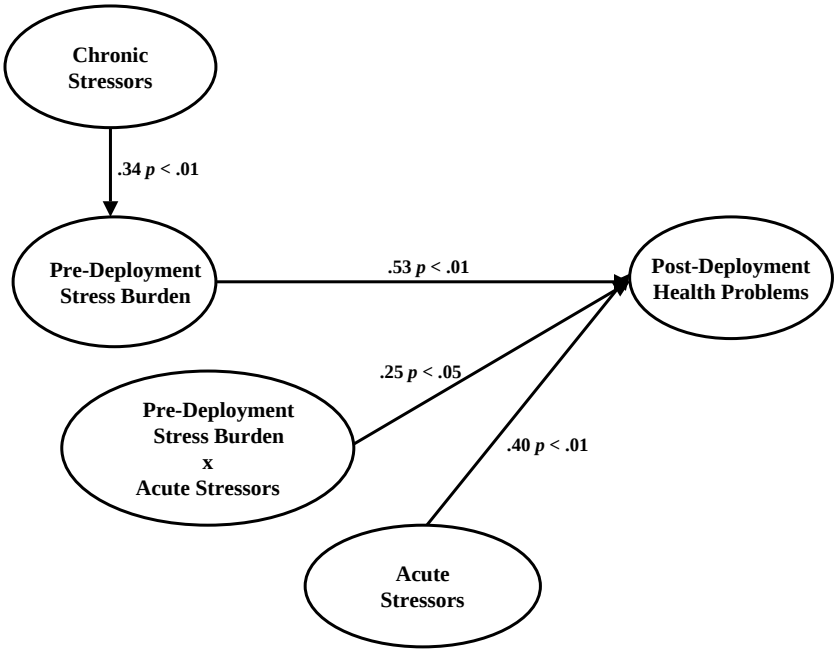


*Figure 2.9.* Structural model of Study 1 including the hypothesized mediation (hypothesis 1a), main (hypothesis 1b), and moderation (hypothesis 1c) effect showing standardized path coefficients.

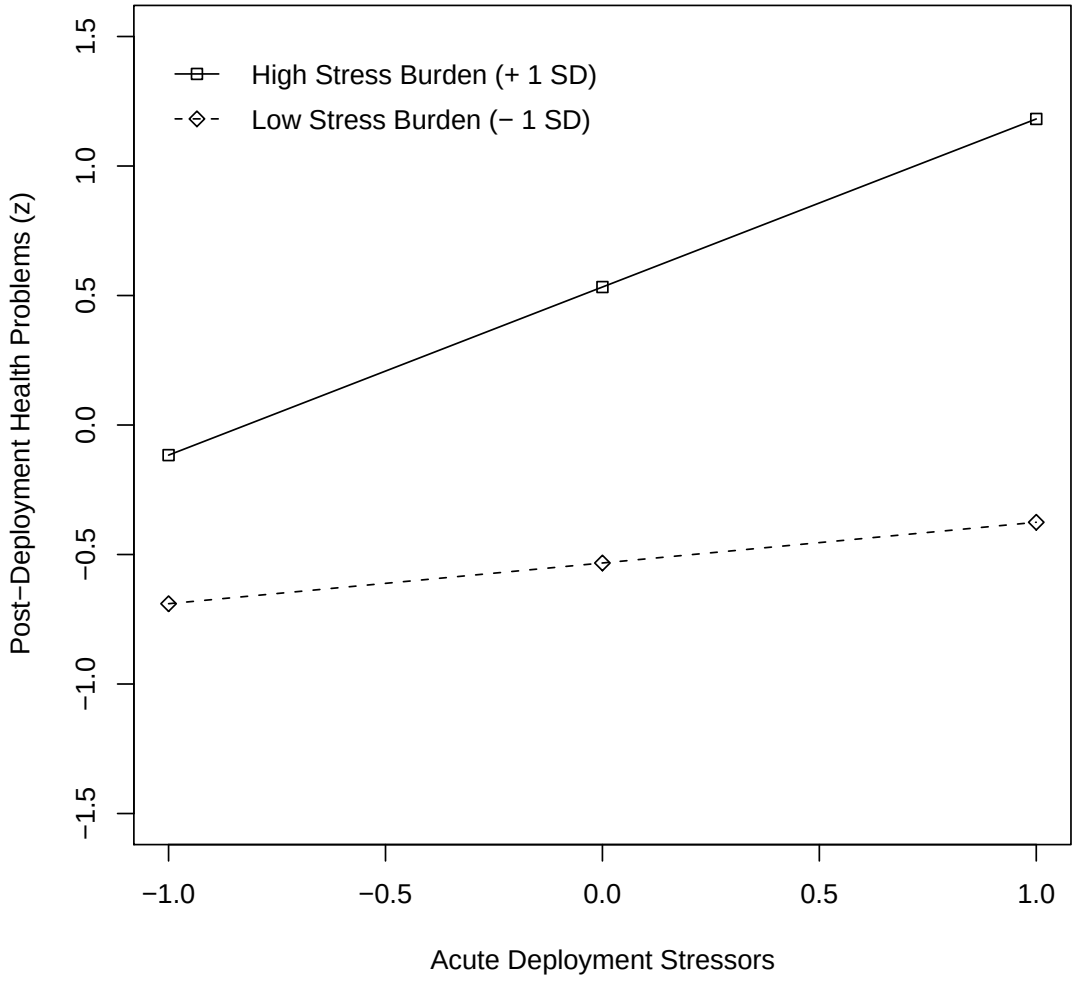


*Figure 2.10.* Interaction of the latent variables of pre-deployment stress burden and acute stressors during deployment on post-deployment health problems.

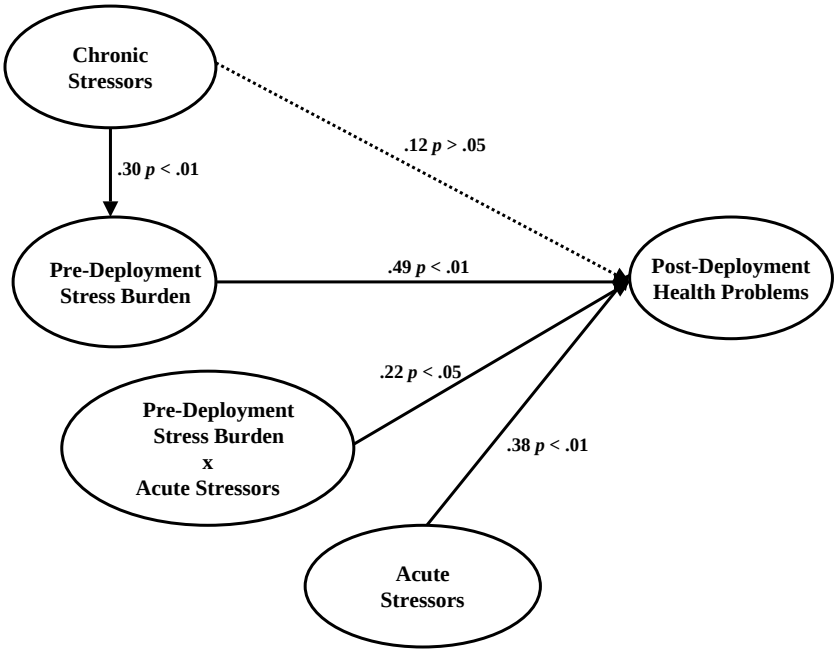


*Figure 2.11.* Structural model with a direct path from chronic stressors to post-deployment health problems. The dotted line indicates an unsignificant standardized path coefficient.

fitted the data better than the fully mediated model. The difference in $\chi^2$ between the two models was not significant ($\Delta\chi^2$= 1.14, $\Delta$df = 1, $p$ = .29). Thus, the more parsimonious model should be used. To directly test whether the mediation was significant, a Sobel test was conducted, which revealed that the mediation of pre-deployment stress burden was significant ($z$ = 2.30; $p < .05$). This result supported hypothesis 1a.

## 2.5. Discussion

The present study aimed at developing a job stress model considering both chronic and acute job-related stressors in the job setting of Reserve Component members. Therefore, it made use of an existing stress model to derive its hypotheses. McEwen's (1998) *Allostatic Load Model* was used to analyze how chronic stressors within the Reservists' civilian environment, resulting from the activation, affected Reservists' health at post-deployment, as well as how these chronic stressors affected the impact of acute stressors encountered during deployment on the amount of Reservists' psychological health problems at post-deployment through pre-deployment stress burden.

### 2.5.1. Study Findings

The results of Study 1 supported the hypothesis that not only acute stressors during deployment but also chronic stressors from pre-deployment have an influence on Reservists' well-being at post-deployment. Specifically, chronic pre-deployment stressors Reservists face in their civilian job or within their families due to their activation led to a certain amount of pre-deployment stress burden, which in turn affected Reservists' post-deployment health. These findings concerning the main effect of both chronic and acute job-induced stressors is consistent with previous research findings (Day & Livingstone, 2001; Dewe, 1991; van der Ploeg et al., 2003).

Moreover, Reservists who already began their deployment with pre-deployment stress burden showed the worst health problems when they additionally had to face acute work related stressors during deployment. Thus, chronic pre-deployment stressors can exert a long-term effect on Reservists' health and reduce an individual's stress tolerance for newly occurring demands. These results follow and confirm the implications of McEwen's (1998) *Allostatic Load Model*. The physiological rational lying behind these inhibition of stress tolerance of chronic stressors has been referred to in the introduction with the study of Schaubroeck and Ganster (1993).

### 2.5.2. Limitations

As in every study there are possible limitations that need to be considered when interpreting the results. One important issue that needs to be considered in the present sample was that the Reserve Components were a self-selected group because they enlisted in the military. Even though the hypotheses were derived from an existing theory, the results might be influenced because of specific characteristics of the group. Reservists might experience high intrinsic motivation and a desire to gain military experiences (Griffith, 2005) and thus have a special perception of their job stressors or ways of coping with job-induced demands.

One additional limitation was the self-report nature of the data, which might have biased the results in terms of response styles and common method variance (Sudman, Bradburn, & Schwarz, 1996; Tourangeau, Rips, & Rasinski, 2000). However, this bias might be reduced as data assessment occurred at two different time points within a 12-month timeframe. Moreover, some of the variables were best treated as self-report because of the appraisal process inherent in determining the presence of a stressor (e.g., Lazarus, 1966). Finally, note that self-report data does not necessarily lead to significant interaction effects (Jex & Bliese, 1999) and Soldier self-report had been found to be reliable in other contexts (Adler, Thomas, & Castro, 2005).

As a further limitation specifically in the context of Study 1 it should be mentioned that the sample size for testing the SEM was relatively small. Due to the focus of pre-deployment stressors only those Reservists could be included that had a civilian job and a family. In general, the requested sample size for SEM lies over 250 cases (Hu & Bentler, 1998). The present study was only able to include 238 Reservists in the analyses. However, for model evaluation, fit indices were used that are known to be suitable for small sample sizes ($N < 250$; Hu & Bentler, 1998). Additionally, by estimating the model with LISREL version 8.30 (Jöreskog & Sörbom, 1999) note that this software version is using a conservative $\chi^2$-value for calculating the null model (Jöreskog, 2004; Schmuckle & Hardt, 2005).

Finally, another limitation might be that the evaluation of model fit in the present study was based on relatively liberal evaluation standards (Kline, 1998), while some researchers, like Hu and Bentler (1998), have proposed more restrictive cutoff values.

Especially, the CFI and NNFI fit indices are laying in between the liberal and conservative cutoff range. However, due to the complex nature and the new developmental stage of the model its fit should be regarded as acceptable.

### 2.5.3. Implications and Future Directions

Future research should replicate the results of the present study for different deployments including combat or peacekeeping, where Reservists may encounter other types of stressors. The present study, for example, did not include the effect of traumatic war-related stressors. It may be that traumatic stressors are so powerful that they drown the influence of chronic stressors and balance out the difference between active duty and reserve Soldiers. Thus, future research effort is needed to integrate the findings of the present study into an overall job stress model, which further distinguishes between the different quality of work-related chronic as well as acute stressors.

As the present study focused on the job setting of U.S. Reservists, future research should replicate the study with the Reserve Components of other nations. Whereas it is not expected that the interaction of chronic and acute stressors will differ for other countries, there might be other components of chronic or acute stressors that need to be considered. On the federal level, every country has its own rules and regulations of how Reservists can arrange their civilian and military life (i.e., the USERRA in the U.S.). Other countries may have other laws that pose less or even increased stress on a deployed Reservist. On the organizational level, there may be significant differences regarding the benefits and rights Reservists have in comparison to their active duty counterparts. For example, there has been a debate whether the U.K. is neglecting the health problems of its Reservists as they were denied access to military psychologists (Carrell, 2006, April 2nd). Also on the individual level it may be that members of other countries share a stronger national identity and patriotism. These attitudes may foster the support for Reservists who are serving their country, leading to increased acceptance for military participation also within a Reservist's family.

In general, the results of the present study showed that individuals are not only

influenced by stressors of their immediate environment (i.e., work environment) but they may as well carry with them pre-occurring chronic stressors that affect individuals' stress perception in acute stress situations on the job. Thus, the long-term impact of potential chronic stressors should not be overseen in occupational stress research.

The findings of the present study may apply to other work settings as well. Especially in times of globalization and increased competitive work conditions, a lot of people make the sacrifice of accepting jobs in areas far away from their families. For an employee who is a weekend-commuter, the stressors occurring within the family due to the special job condition of the spouse may cause additional stress other than the actual job stressors at work. Employees going on frequent and extended business trips may also face similar problems, where they may need to manage their absent time from home in addition to their job demands. Other people accept working abroad for several months or even years and may not be able to take their families with them. These individuals may face a similar situation as has been analyzed in the present study. Thus, the concept of the present study that looked at chronic as well as acute work-related stressors could easily be replicated and have implications for other work settings besides the military.

In this work-related context the results of the present study have implications for organizations who are dependent on the flexibility of their employees. The additional burden that organizations put on their employees needs to be balanced out somehow. Otherwise, the capability of handling acute job demands will decrease and employee health will suffer. In the long run, decreased well-being will also lead to reduced job performance (Lang, Thomas, Bliese, & Adler, in press; Motowidlo, Packard, & Manning, 1986; Stewart & Barling, 1996). Potential arrangements for affected employees might be paid leave after a longer business trip, reimbursement for family visits abroad, or companies' child care programs. Additionally, benefits like flexible work arrangements, information and referral services, family-responsive training for supervisors, financial aid, family friendly leave policies and funding to expand the pool of child and elder care services in the community were already implemented in some international companies as early as in the 1990s (Frankel, 1998). These family-friendly programs have led to significant effects regarding reduced turnover

rates and absenteeism, which were not only noticable in reduced worker stress but also in reduced organizational costs (e.g., for recruitment). Ultimately, employee psychological well-being and job performance are important outcomes to consider as both outcomes affect the success of an organization.

# 3. Study 2: The Role of Individual Differences

In the *Allostatic Load Model*, McEwen (1998) formulated a stress model in which he identified different pathways to decreased health (see Figure 2.1). Thereby, McEwen offered a convenient framework to analyze different hypotheses relevant in stress research. In Study 1 chronic and acute environmental stressors were analyzed for their impact and their cumulative interaction effect on post-deployment health outcomes. However, within the same model a separate path predicts that not every individual shows the same stress reaction (see Figure2.1). Rather all individuals exert their own specific stress response depending on personal dispositions. The individual differences identified in the *Allostatic Load Model* include for example, genetic predispositions, child development or life experiences. McEwen proposed that personal characteristics function as moderators in an individual's stress response. Thus, building on the findings of Study 1 and adding a new research path from the *Allostatic Load Model*, the aim of the present study (Study 2) was to identify individual difference moderators that have the potential to influence the negative impact of chronic and acute stressors on long-term health outcomes.

## 3.1. The Impact of Individual Moderators

Moderators are critical components of stress models for two reasons. First, they represent constructs on which most interventions are based (Bliese & Castro, 2003). Thus, knowing these potential moderators as either increasing or decreasing an individual's stress sensitivity is an important information for organizations, which want

to offer stress intervention programs for their employees. By training to enhance the relevant moderators, employees could acquire the relevant skills that make them more resilient towards stress.

Second, individual moderators in stress models represent constructs that underlie a person's adaptation (Bliese & Castro, 2003). Individuals are able to efficiently manage stressful situations if they quickly and adequately adapt to the stressful situation (Lazarus & Folkman, 1984). Past research has studied a large amount of individual attributes, which serve as potential resiliency constructs. Resiliency constructs that have been identified as reducing psychological strain were for example, sense of coherence, sense of humor, hardiness, self-efficacy, and coping (Coetzee & Cilliers, 2001).

For the purpose of the present study, especially two individual difference variables were relevant to consider, namely the constructs of self-efficacy and coping. These constructs are relevant for two reasons. First, both attributes can be trained (e.g., through behavior modeling techniques, cognitive restructuring, and by changing causal explanations for task outcomes). Second, past research has identified these two constructs as promising personal resources an individual can turn to, specifically under high stress exposure (Bliese & Castro, 2003).

### 3.1.1. Self-Efficacy

Self-efficacy can be defined as the individuals' belief in their capabilities to mobilize the motivation, cognitive resources and courses of action needed to meet given situational demands (Wood & Bandura, 1989). Specifically, job related self-efficacy can be defined as the individual's confidence in his/her ability to perform work-related tasks or missions well (Bliese & Stetz, in press). Job self-efficacy is particularly relevant to Reservists because the relatively sudden transition from a part-time Reservist to a full-time active Soldier probably raises the question of task efficacy, especially for Reservists whose civilian job differs in a large amount from their military duty.

Usually, individuals who have a strong reliability of succeeding in their jobs are more resistant to job stressors. Several studies have shown positive or ameliorating effects of self-efficacy on psychological health (i.e., anxiety, depression) within the

context of occupational stress (Jex & Bliese, 1999; Jex, Bliese, Buzzell, & Primeau, 2001; Schaubroeck, Lam, & Xie, 2000; Schaubroeck & Merritt, 1997). Also a study conducted in the military setting has reported self-efficacy to buffer the stressor-strain relationship in a Reservist sample (Bliese & Stetz, in press).

### The Role of Stressor (Un)Controllability

However, Bliese and Stetz (in press) also reported that the buffering effect of job-related self-efficacy on the relationship between work stressors and well-being only functioned under conditions of high procedural justice. That is, self-efficacy only served as a personal resource for individuals who perceived their organization having fair policies and procedures. Bliese and Stetz (in press) argued that injustice may impact an individual's sense of control over the work environment.

In fact, other researchers already linked self-efficacy and control (Schaubroeck & Merritt, 1997). Self-efficacy turned out to be even harmful when individuals were not in control over a task they had to perform. For highly self-efficient people a lack of control may influence their self-concept. They might tend to experience more self-blame for not being able to cope with job demands.

Similarly, there is some research arguing that work-related stressors are more important for individuals who are tied to their job through some form of psychological investment (Britt, 1999; Feather, 1981; Fox & Dwyer, 1999). Researchers believe that the underlying mechanism for personal moderators that strengthen the stressor-strain relationship is that individuals somehow become personally engaged in their work (Britt & Bliese, 2004). Thus, work related stressors that impede an individual's job performance become more frustrating for those individuals who have a personal investment in their job performance. A study conducted by Britt, Castro, and Adler (2005) confirmed this hypothesis. Britt et al. (2005) found self-engagement to potentiate the relationship between impeding work stressors and well-being.

Thus past research findings indicated that self-efficacy should not generally be considered as a resilience factor. Instead, the way self-efficacy influences an individual's well-being is dependent on the nature of the situation. When considering the types of stressors Reservists encounter in the present study, they don't seem to

leave much space for personal control. Specifically, Reservists had to report what situations occurred that actually impeded them to perform their military job (i.e., organizational impediments), how many times the people in their units had conflicts with each other (i.e., interpersonal conflict), how unpredictable their daily job had been (i.e., job unpredictability) and how they were exposed to disrespectful behavior of their supervisors (i.e., negative leadership behavior). It may be unlikely that someone could have actual control over these kinds of stressors, which additionally have the potential to impede one's performance.

Regarding Reservists' pre-deployment stress burden, the influence of self-efficacy seems less clear. Stress burden may distract an individual from daily job tasks, or would even lead to a perception of reduced self-efficacy. Stress burden resulting from the activation is also not changeable during the deployment, thus job related self-efficacy should not be an effective resource.

Therefore, in developing a job stress model that includes individual differences, the hypothesis regarding self-efficacy influencing the impact of chronic and acute work stressors on long-term health was stated as follows:

> *Hypothesis 2a*: Reservists who perceive job-related self-efficacy show more psychological health problems at post-deployment when they encounter situations they are unable to manage (i.e., stress burden) and job stressors that impede their job performance (i.e., organizational impediments, job unpredictability, interpersonal conflict, negative leadership behavior).

### 3.1.2. Coping

Another frequently studied individual difference variable that has the potential to function as a resilience factor is the way individuals cope with stressors (Parkes, 1990). According to Folkman (1984) coping refers to "cognitive and behavioral efforts to master, reduce, or tolerate the internal and/or external demands that are created by a stressful event" (p. 843). Coping is partly determined by genetic factors and partly by childhood experiences (Theorell, 2003). It is regarded as an adaptive life

behavior (Holahan & Moos, 1985) and thus has the potential to influence the impact of a stressor on individuals' strain.

Typically, researchers distinguish between two different types of coping: problem-focused coping and emotion-focused coping (e.g., Aldwin & Yancura, 2004; Endler & Parker, 1990; Lazarus & Folkman, 1984). The former means that a person actively does something to alter the stressor whereas the latter one means that a person internally tries to deal with the feelings and emotions brought up by the stressor. The dichotomization of coping strategies has proven to be a pretty stable factor structure throughout existing coping inventories (Endler & Parker, 1990). Under these major coping categories several specific coping styles are subsumed. Specifically, active coping is an example of a problem-focused coping strategy and includes cognitions and behaviors directed to analyzing as well as solving a problem. Passive or also called avoidant coping is a strategy that falls under the emotion-focused coping category and includes behaviors that try to ignore the problem or stressor, impeding the individual's adaptation to the situation and may also include the use of substances (i.e., alcohol, drugs) to regulate an emotion (Aldwin & Yancura, 2004).

Previous research has found that active coping strategies buffered the impact of stress on mental health outcomes (Jex et al., 2001; Sherbourne, Hays, & Well, 1995; Wanberg, 1997). By approaching a problem, the individual was able to adapt to the changed situation or to resolve the problem and thus eliminate the stressor. On the other hand, use of avoidant coping strategies has typically been found to be disadvantageous and has been linked to poor outcomes (e.g., Jex et al., 2001; Sherbourne et al., 1995; Smith & Sulsky, 1995) as avoiding a stressful situation doesn't resolve the problems and leaves an individual unadapted over a long period of time.

### The Role of Stressor (Un)Controllability

However, similar to the functioning of self-efficacy, there have been found situational influences that changed the effectiveness of the two different coping styles. For active coping, researchers found that it was only effective if an individual could control and change a situation (Ippolito et al., 2005; Latack, 1986; Wanberg, 1997) and thus

also active coping may sometimes be related to distress (Cheng, Hui, & Lam, 1999; Folkman, Lazarus, Gruen, & DeLongis, 1986). In line with past research (Folkman et al., 1986; Weisenberg et al., 1993), passive coping may as well function as a buffer of the stressor-strain relationship, when the situation doesn't allow for any problem-focused strategies because it is beyond the individual's control. That means that there is also no general effective coping strategy but rather an adequate coping response in accordance with the nature of the encountered situation.

Since the acute job stressors of the present study have been identified as rather uncontrollable stressors, an active coping strategy should not be beneficial. Even when facing high pre-deployment stress burden, which cannot be directly influenced, active coping strategies should potentiate the damaging effects of these stressors on psychological health problems. Instead, for the case of the present deployment passive coping should be a helpful resource when trying to overcome pre-deployment stress burden as well as acute deployment stressors.

In aiming at developing a second stress framework for the unique situations of Reservists based on McEwen's *Allostatic Load Model*, which also considers individual resources, the following was hypothesized:

> *Hypothesis 2b*: Reservists who report engaging in high active coping while experiencing high pre-deployment stress burden as well as acute stressors show increased psychological health problems at post-deployment. However, Reservists who report engaging in passive coping under these uncontrollable conditions report decreased health problems at post-deployment.

Taken together, the second study considered personal resources (i.e., individual differences) as possible resiliency factors that can account for a differential impact of stressors on Reservists' health. An overview of the stress framework used for Study 2 is shown in Figure 3.1. Similarly to Study 1, pre-deployment stress burden and acute stressors during deployment have a direct impact on Reservists' psychological health problems after deployment. Additionally, as has been supported in Study 1, there is an interaction between pre-deployment stress burden and acute stressors

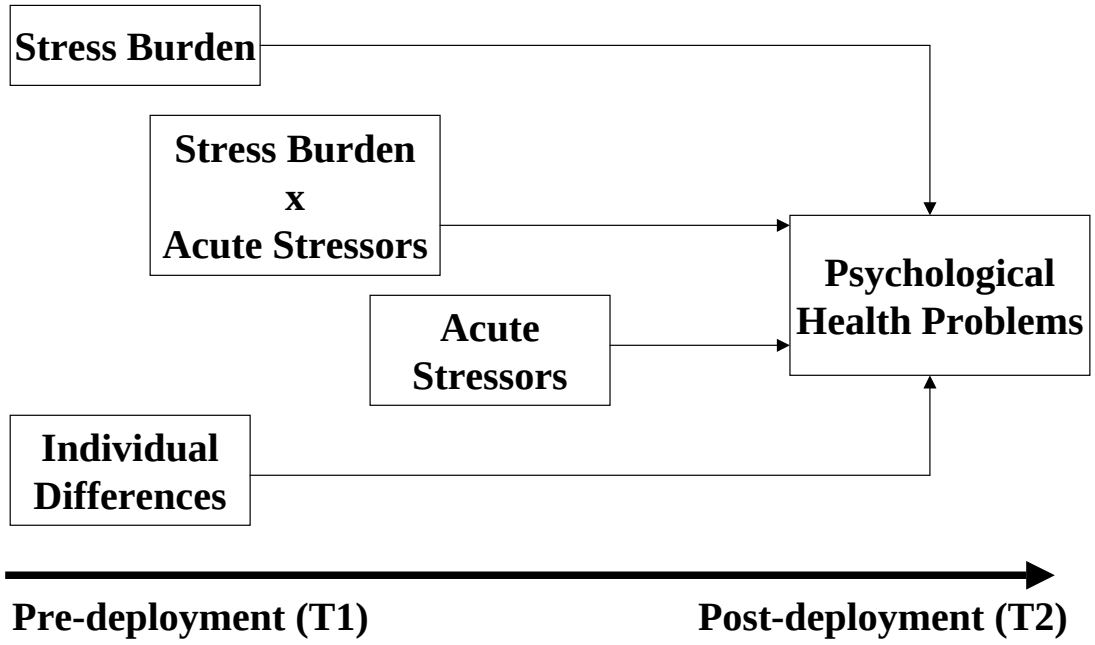


*Figure 3.1.* Proposed comprehensive job stress model of Reservists, showing the impact of unique acute deployment stressors on post-deployment psychological health problems as well as the moderating influence of individual differences on the cumulative effect of pre-deployment stress burden and acute stressors on post-deployment psychological health problems.

on Reservists' health outcome. However, the focus of the present study was the influence of Reservists' individual differences on the stressors-health relationship.

## 3.2. Method

### 3.2.1. Participants and Procedure

The sample of the present study consisted of 482 reserve component Soldiers (98.9% National Guard, and 1.1% Active Guard Reserve). The majority of the sample was male (94%) with a mean age of 32 years (SD = 9.02). Most participants identified

themselves as Caucasian (89.2%, vs. 5.8% as African American, 3.3% as Hispanic, and 1.7% as other) with the majority being enlisted Soldiers (95.9%, vs. 3.9% Commissioned Officers, and 0.2% Warrant Officers). The procedure of data collection was equal to Study 1, as the present sample also stemmed from the same dataset. Please note that sample size has increased from Study 1 to Study 2 because the study was not limited to Reservists who were married and employed.

### 3.2.2. Measures

The measures for Study 2 partly relied on the same scales already used in Study 1. These scales included the GHQ-12 and PHQ-9 at Time 1 (T1) for pre-deployment stress burden and all the scales assessing deployment stressors at Time 2 (T2).

*Individual differences*: Individual moderators were assessed at T1 and included, self-efficacy, active and passive coping style. Self-efficacy was assessed with a scale originally developed by Jones (1986) and modified for this study. The scale contained five items measuring job-related self-efficacy (i.e., *based on my experiences, I am confident that I will be able to successfully perform my current job*). Response options ranged from 1 = *strongly disagree* to 5 = *strongly agree*.

Coping was assessed with a scale developed by the Walter Reed Army Institute of Research (Jex et al., 2001). Reservists were asked to indicate on a five-point scale how often they used specific strategies when they feel stressed (1 = *never* to 5 = *always*). Active coping was assessed with a six-item subscale (i.e., *change what's causing the stress*, *decide what needs to be done*). Passive coping was assessed with a nine-item subscale (i.e., *become apathetic and just don't care*, *daydream*).

*Outcomes*: Study 2 relied on the same outcome measures for psychological health problems (GHQ-12, PHQ-9) assessed at T2 as it was the case for Study 1. Table 3.1 provides an overview of all measures used for study 2.

### 3.2.3. Analytic Strategy

As in Study 1, all independent variables were z-standardized to prevent multicollinearity and facilitate model estimation due to the hypothesized moderation ef-

*Table 3.1.* Measures in Study 2

| Scales | Items | Reference |
|---|---|---|
| **Pre-Deployment Stress Burden T1** | | |
| General Health Questionnaire | 12 | Goldberg (1972) |
| Personal Health Questionnaire | 9 | Kroenke et al. (2001) |
| **Deployment Stressors T2** | | |
| Organizational Impediments | 10 | Spector and Jex (1998) |
| Job Unpredictability | 6 | Castro and Adler (2001) |
| Interpersonal Conflict | 4 | Spector and Jex (1998) |
| Negative Commander Behavior | 5 | House et al. (2004) |
| Negative 1st Sergeant Behavior | 5 | House et al. (2004) |
| **Individual Differences T1** | | |
| Self-Efficacy | 5 | Jones (1986) |
| Active Coping | 5 | Jex et al. (2001) |
| Passive Coping | 9 | Jex et al. (2001) |
| **Outcomes: Psychological Health Problems T2** | | |
| General Health Questionnaire | 12 | Goldberg (1972) |
| Personal Health Questionnaire | 9 | Kroenke et al. (2001) |

fects (Aiken & West, 1991). As the values of the outcome measures did not have a relevant value by themselves (e.g., like money or temperature), they were also standardized for easier model interpretation. Analyses were conducted in LISREL 8.30 (Jöreskog & Sörbom, 1999) using maximum-likelihood estimation and the statistical language R 2.1.0 (R Development Core Team, 2005).

The set of hypotheses for Study 2 (hypotheses 2a and 2 b) related to the influence of individual differences on Reservists' health based on the *Allostatic Load Model*. These hypotheses were analyzed using a moderated regression approach. Different from Study 1, no structural equation modeling approach was applied for the present investigation as the latent interaction would have been too complex, due to the many manifest indicators. In order to generally reduce the amount of the many variables even for the moderation, the acute deployment stressors were first analyzed using a Confirmatory Factor Analysis (CFA). That way, a justification for measure aggregation was provided. Data aggregation was conducted by forming unit-weighted $z$-score composites for the separate constructs (Ackerman & Beier, 2006; Cohen, 1990). Following the data aggregation, each set of predictors was entered sequentially into the regression equation such that the increase in explained variance could be analyzed for significance. That means, first pre-deployment stress burden was entered in the regression equation. Second, the aggregated measure of acute deployment stressors was entered in the second step, followed by the interaction of stress burden and deployment stressors as a third step. Finally, the individual differences variable was entered simultaneously with the interaction terms as no direct effect of the individual difference variables was predicted.

## 3.3. Results

### 3.3.1. Descriptive Statistics

Variables' means, standard deviations and reliabilities are presented in Table 3.2. The correlations between all study variables for Study 2 are given in Table 3.3. An interesting observation from table 3.3 were the correlations between the single individual characteristics with the outcome variables. The relationships were according

*Table 3.2.* Means, Standard Deviations, and Cronbach's $\alpha$ of Variables in Study 2

| Variable | Mean | SD | $\alpha$ |
|---|---|---|---|
| **Pre-Deployment Stress Burden T1** | | | |
| Psychological Health Symptoms | 1.21 | 0.37 | .75 |
| Depressive Symptoms | 1.28 | 0.41 | .88 |
| **Deployment Stressors T2** | | | |
| Organizational Impediments | 2.09 | 0.92 | .92 |
| Job Unpredictability | 2.13 | 0.67 | .83 |
| Interpersonal Conflict | 3.00 | 0.87 | .91 |
| Negative Commander Behavior | 2.67 | 0.91 | .88 |
| Negative 1st Sergeant Behavior | 2.60 | 0.91 | .89 |
| **Individual Differences T1** | | | |
| Active Coping | 3.27 | 0.66 | .81 |
| Passive Coping | 2.09 | 0.63 | .85 |
| Self-Efficacy | 4.06 | 0.54 | .80 |
| **Outcomes: Psychological Health Problems T2** | | | |
| Psychological Health Symptoms | 1.29 | 0.36 | .78 |
| Depressive Symptoms | 1.29 | 0.51 | .92 |

to the general expectation from past research that active coping and self-efficacy would be associated with reduced health problems, whereas passive coping would be associated with increased health problems. The question that drove the present study was whether these relationships can be generalized over all kinds of situations and would remain stable also under uncontrollable stressful conditions.

### 3.3.2. Confirmatory Factor Analysis

In order to reduce the large amount of variables and to follow the example of Study 1 in which higher order constructs were used, again a CFA was conducted testing for one factor of all deployment stressors as well as for one factor of the variables

*Table 3.3.* Correlations of Variables in Study 2

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Psychological Health Symptoms T1 | - | | | | | | | | | | |
| 2. Depressive Symptoms T1 | .41 | - | | | | | | | | | |
| 3. Organizational Impediments T1 | .10 | .16 | - | | | | | | | | |
| 4. Job Unpredictability T2 | .13 | .13 | .39 | - | | | | | | | |
| 5. Interpersonal Conflict T2 | .12 | .16 | .40 | .25 | - | | | | | | |
| 6. Negative Commander Behavior T2 | .07 | .04 | .16 | .29 | .11 | - | | | | | |
| 7. Negative 1st Sergeant Behavior T2 | .05 | .08 | .05 | .23 | .12 | .41 | - | | | | |
| 8. Active Coping T1 | -.26 | -.10 | .04 | .00 | -.06 | -.08 | -.07 | - | | | |
| 9. Passive Coping T1 | .34 | .30 | .09 | .05 | .12 | .02 | -.02 | .00 | - | | |
| 10. Self-Efficacy T1 | -.21 | -.11 | -.01 | -.01 | .04 | -.01 | .00 | .17 | -.11 | - | |
| 11. Psychological Health Symptoms T2 | .30 | .27 | .19 | .30 | .26 | .12 | .20 | -.13 | .17 | -.04 | - |
| 12. Depressive Symptoms T2 | .22 | .49 | .26 | .28 | .24 | .09 | .14 | -.07 | .19 | .00 | .47 |

*Note.* Critical values: $p < .05$ at $|r| = .09$ for two-sided tests; $p < .01$ at $|r| = .12$ for two-sided tests.

of pre-deployment stress burden and one factor of the variables of post-deployment health problems. Overall, the model fitted the data well $\chi^2$(df = 21; N = 482) 57.72, $p$ = .00, $\chi^2$/df = 2,75, SRMR = .04, CFI = .95, NNFI = .92. The good fitting nature of the measurement model permitted it to aggregate the respective variables to their overall constructs by forming unit-weighted $z$-score composites, respectively (Ackerman & Beier, 2006; Cohen, 1990). Thus, for the moderated regression analyses, the variables organizational impediments, job unpredictability, interpersonal conflict as well as negative commander and 1SGT leadership behavior were aggregated into a variable called deployment stressors. Similarly, depressive symptoms at T1 and psychological health symptoms at T1 were aggregated into a variable labeled pre-deployment stress burden. Finally, depressive symptoms at T2 and psychological health symptoms at T2 were aggregated into one variable labeled post-deployment health problems. Descriptive statistics of the final variable set used for the moderated regression analyses in Study 2 are presented in Table 3.4. Please note that the reliabilities for each of the aggregated variables are stratified Cronbach's $\alpha$ so that the item's subcategories were considered (Cronbach & Shavelson, 2004; Osburn, 2000). As was was the case with the single variables, generally, active coping and self-efficacy were associated with less health problems, whereas passive coping was associated with more post-deployment health problems.

### 3.3.3. Regression Analyses

In order to test the moderating role of individual differences on the relationship between stressors and psychological health problems, a set of hierarchical linear regression was conducted. As a first step, pre-deployment stress burden was entered into the equation predicting post-deployment health problems. Second, the aggregated variable of deployment stressors was entered. Third, the interaction between pre-deployment stress burden and deployment stressors was entered into the equation in order to replicate the finding from Study 1. Finally, as no direct effect of the individual difference variables was predicted, the respective individual difference variable was simultaneously entered into the equation together with the necessary terms for the three-way interaction.

*Table 3.4.* Means, Standard Deviations, Correlations and Cronbach's $\alpha$ of all Aggregated Variables Included for the Regression Analyses in Study 2

| Variable | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| 1. Pre-Deployment Stress Burden T1 | 1.24 | 0.33 | (.94) | | | | | |
| 2. Acute Deployment Stressors T2 | 2.50 | 0.53 | .20 | (.99) | | | | |
| 3. Active Coping T1 | 3.27 | 0.66 | -.21 | -.06 | (.81) | | | |
| 4. Passive Coping T1 | 2.09 | 0.63 | .38 | .08 | .00 | (.85) | | |
| 5. Self-Efficacy T1 | 4.06 | 0.54 | -.19 | .01 | .17 | -.11 | (.80) | |
| 6. Psychological Health Problems T2 | 1.29 | 0.38 | .46 | .38 | -.11 | .21 | -.02 | (.97) |

*Note.* Cronbach's $\alpha$ appears on the diagonal in parentheses.
Critical values: $p < .05$ at $|r| = .10$ for two-sided tests;
$p < .01$ at $|r| = .13$ for two-sided tests.

Regarding the interaction effect of pre-deployment stress burden and deployment stressors the present study was able to replicate the findings from Study 1 (e.g., Table 3.5). Adding the interaction term to the hierarchical regression equation led to a significant effect. The interaction is graphed in Figure 3.2. Specifically, Reservists reporting both high pre-deployment stress burden and acute deployment stressors are also reporting the strongest health complaints at post-deployment.

Results regarding the impact of each individual difference variable on the interaction of pre-deployment stress burden and deployment stressors are presented from Table 3.5 to Table 3.7. Concerning the first individual difference variable under study, the three-way interaction of pre-deployment stress burden, deployment stressors and job related self-efficacy was significant. The interaction is graphed in Figure 3.3. The way self-efficacy influenced post-deployment health was consistent with hypothesis 2a. As expected job-related self-efficacy was not an effective individual resource under conditions of high pre-deployment stress burden. Additionally, Reservists who only had to deal with deployment stressors that had the potential to impede their job performance reported increased health complaints when they experienced to be highly self-efficient. Self-efficacy seemed to be only helfpul when the job situation was not stressful.

Concerning the second individual difference variable under study two different coping styles had been analyzed. The three-way interaction of pre-deployment stress burden, deployment stressors and active coping was only significant at the .10-level (Table 3.6), whereas the three-way interaction with passive coping was significant at the .05-level (Table 3.7). The interaction for active coping was graphed in Figure 3.4. Similar to the influence of self-efficacy, the way active coping influenced post-deployment health was consistent with hypothesis 2b. When Reservists had to deal with a lot of deployment stressors that potentially impeded their job performance, the use of active coping was associated with increased health problems at post-deployment. However, due to the low significance of the three-way interaction the result can only be seen as a trend.

The interaction for passive coping was graphed in Figure 3.5. For passive coping, the variable's influence on post-deployment health was only partially consistent with hypothesis 2b. Passive coping was only a positive individual resource, when

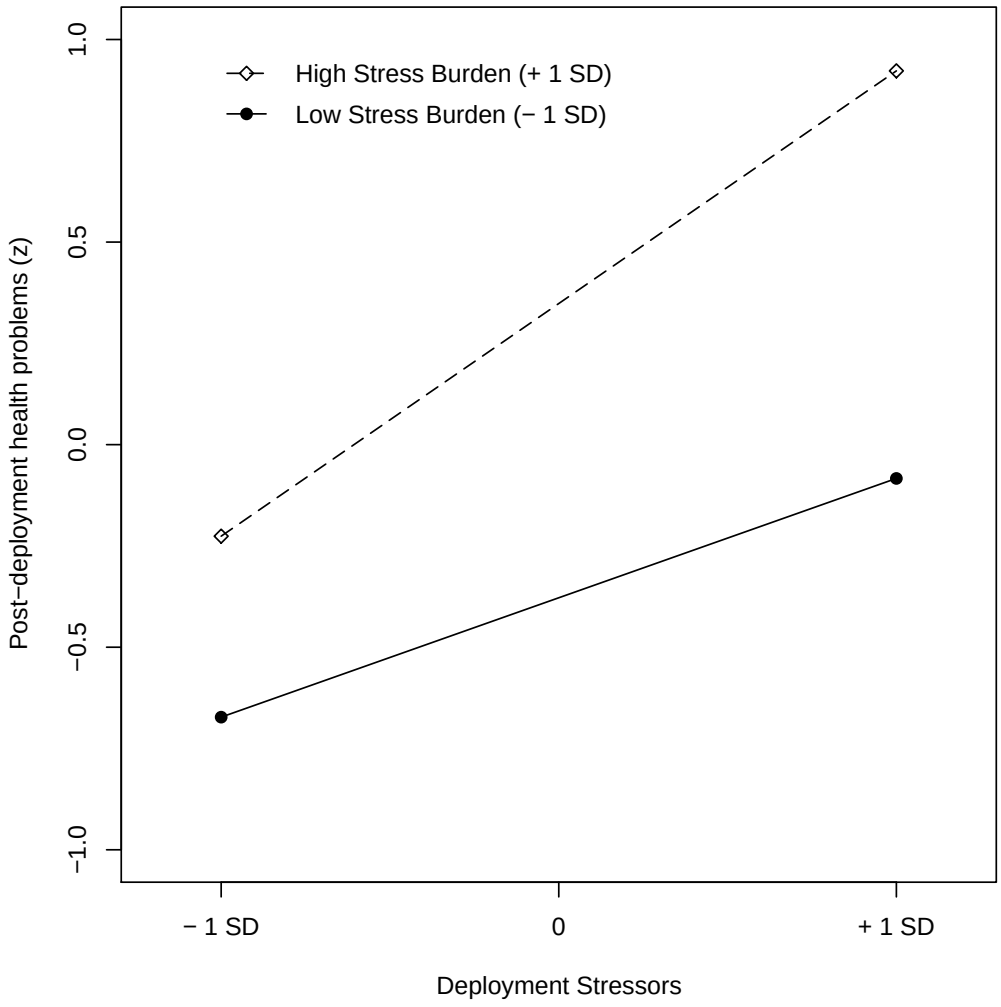


*Figure 3.2.* Two-way interaction of pre-deployment stress burden and deployment stressors predicting post-deployment health problems.

*Table 3.5.* Hierarchical Regression Analysis for Hypothesis 2a with Job Related Self-Efficacy as an Individual Difference Variable Predicting Post-Deployment Health Problems

| Variables | $\beta$ | $SE$ | $\Delta R^2$ | $p$ |
|---|---|---|---|---|
| Step 1 | | | .20 | .00 |
| Pre-Deployment Stress Burden T1 | .37 | .04 | | .00 |
| Step 2 | | | .09 | .00 |
| Deployment Stressors T2 | .38 | .05 | | .00 |
| Step 3 | | | .01 | .01 |
| Stress Burden × Deployment Stressors | .15 | .06 | | .01 |
| Step 4 | | | .03 | .00 |
| Job-Related Self-Efficacy T1 | .08 | .03 | | .03 |
| Self-Efficacy × Stress Burden | .01 | .03 | | .76 |
| Self-Efficacy × Deployment Stressors | .12 | .06 | | .05 |
| Self-Efficacy × Stress Burden × Deployment Stressors | -.20 | .05 | | .00 |

*Note.* Adjusted $R^2 = .32$; $F(7, 474) = 33.01$, $p < .001$

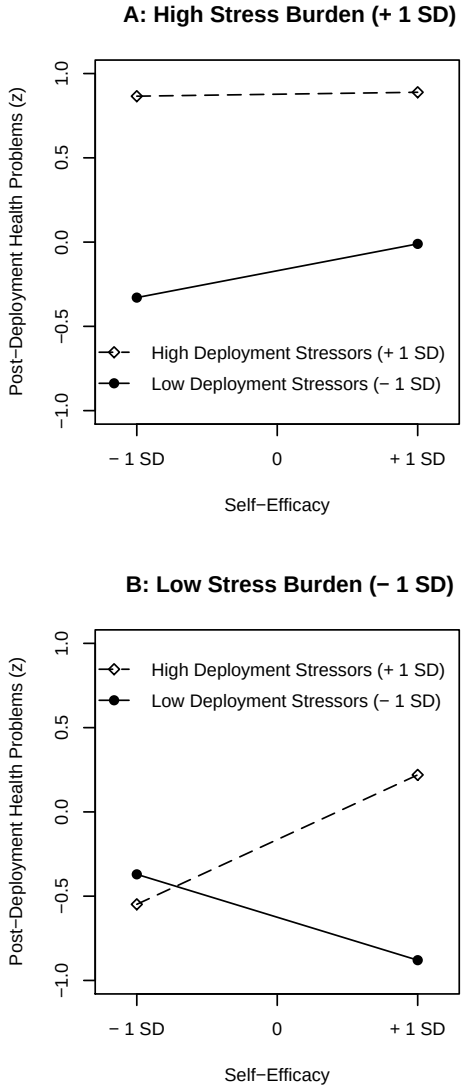


*Figure 3.3.* Three-way interaction showing the relationship among pre-deployment stress burden, deployment stressors and job related self-efficacy in predicting post-deployment health problems.

*Table 3.6.* Hierarchical Regression Analysis for Hypothesis 2b with Active Coping as an Individual Difference Variable Predicting Post-Deployment Health Problems

| Variables | $\beta$ | $SE$ | $\Delta R^2$ | $p$ |
|---|---|---|---|---|
| Step 1 | | | .20 | .00 |
| Pre-Deployment Stress Burden T1 | .35 | .04 | | .00 |
| Step 2 | | | .09 | .00 |
| Deployment Stressors T2 | .39 | .06 | | .00 |
| Step 3 | | | .01 | .01 |
| Stress Burden × Deployment Stressors | .12 | .06 | | .06 |
| Step 4 | | | .02 | .02 |
| Active Coping T1 | -.01 | .03 | | .71 |
| A. Coping × Stress Burden | -.07 | .05 | | .12 |
| A. Coping × Deployment Stressors | .06 | .05 | | .06 |
| A. Coping × Stress Burden × Deployment Stressors | -.11 | .06 | | .06 |

*Note.* Adjusted $R^2 = .31$; $F(7, 474) = 31.65$, $p < .001$

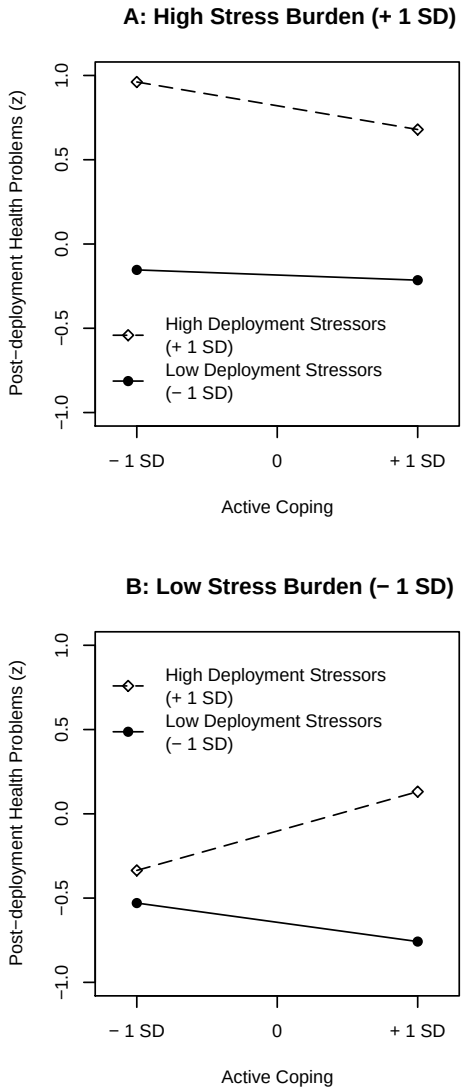


*Figure 3.4.* Three-way interaction of pre-deployment stress burden, deployment stressors and active coping, predicting post-deployment health problems.

*Table 3.7.* Hierarchical Regression Analysis for Hypothesis 2b with Passive Coping as an Individual Difference Variable Predicting Post-Deployment Health Problems

| Variables | $\beta$ | $SE$ | $\Delta R^2$ | $p$ |
|---|---|---|---|---|
| Step 1 | | | .20 | .00 |
| Pre-Deployment Stress Burden T1 | .34 | .04 | | .00 |
| Step 2 | | | .09 | .00 |
| Deployment Stressors T2 | .39 | .06 | | .00 |
| Step 3 | | | .01 | .01 |
| Stress Burden × Deployment Stressors | .10 | .07 | | .12 |
| Step 4 | | | .01 | .11 |
| Passive Coping T1 | .03 | .04 | | .39 |
| P. Coping × Stress Burden | -.06 | .04 | | .18 |
| P. Coping × Deployment Stressors | .03 | .06 | | .54 |
| P. Coping × Stress Burden × Deployment Stressors | .14 | .06 | | .02 |

*Note.* Adjusted $R^2 = .30$; $F(7, 474) = 30.82$, $p < .001$

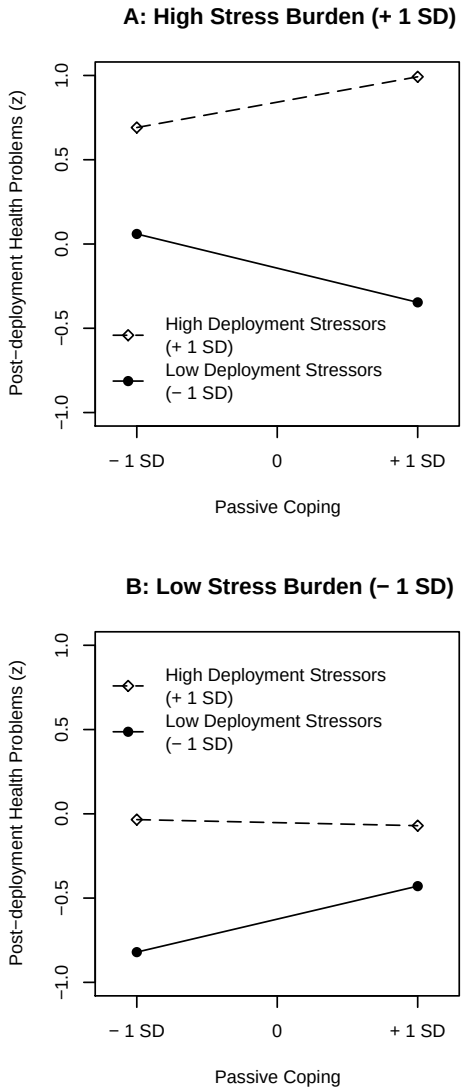


*Figure 3.5.* Three-way interaction of pre-deployment stress burden, deployment stressors, and passive coping, predicting post-deployment health problems.

Reservists had to deal with high pre-deployment stress burden. However, if they additionally reported acute deployment stressors, they also reported increased health problems. The bottom graph of Figure 3.5 indicated a harmful effect of passive coping when Reservists reported both low pre-deployment stress burden and low deployment stressors. However, Reservists under these conditions do best health-wise, as the line pictured a situation where Reservists were under no stress. Thus, this line could represent the general negative association between passive coping and health that has already been found in the simple correlation of Table 3.3 and Table 3.4.

## 3.4. Discussion

The present study aimed at developing a job stress model for Reservists specifically considering individual difference variables that might serve Reservists as a personal resource to be more resilient to stressors related to their activation and deployment. The variables considered particularly relevant for Reservists were self-efficacy and coping. The presented analyses based their hypotheses on McEwen's (1998) *Allostatic Load Model* and resulted from past research on the reported personal attributes.

### 3.4.1. Study Findings

The analyses confirmed that in fact individual differences play a critical role in influencing a person's stress perception and thus a person's health and well-being. A key finding of the present study was that from the variables considered here, there is no single personal resource that is generally beneficial. The efficient adaptation of an individual to a stressor depends primarily on the nature of the stressor.

For example, there has been a large body of research that linked job-related self-efficacy to positive outcomes (e.g., Bliese & Stetz, in press; Jex & Bliese, 1999; Jex et al., 2001; Schaubroeck et al., 2000; Schaubroeck & Merritt, 1997). However, in the present study, instead of functioning as a buffer, the perception of self-efficacy even exacerbated the stressor-strain relationship. This potentiating effect of self-efficacy on the relationship between job stressors and psychological health problems

of Reservists resulted from the rather uncontrollable set of deployment stressors they encountered. A self-efficient worker might be tied to his/her job through some form of psychological investment (Britt, 1999; Feather, 1981; Fox & Dwyer, 1999) and may be more personally engaged in the job (Britt & Bliese, 2004). Thus, when confronted with situations that potentially impede job performance, the individual's self concept gets threatened (Crocker & Wolfe, 2001) which results in increased health symptoms in the long run.

Similarly, active coping - although only resulting as a trend - was found to increase health problems when individuals had to deal with rather uncontrollable situations on the job like an abusive supervisor or highly unpredictable job conditions. Thus, even though generally linked to positive outcomes (Jex et al., 2001; Sherbourne et al., 1995; Wanberg, 1997), in the case of the present study, active coping was not functioning as a Reservist's resilience factor.

Instead, passive coping resulted to buffer the relationship between job stressors and psychological health problems under the condition when Reservists only suffered from pre-deployment stress burden but not from deployment stressors. The reason why passive coping showed an increase in health problems when individuals had to deal with both pre-deployment stress burden and deployment stressors may be because this double amount of stress cannot be compensated anymore. In fact, throughout all the analyses, individuals in the condition of both high stress burden and deployment stressors were worse off healthwise. Seeing passive coping as a specific behavioral stress response, it only functions as a buffer under moderate conditions of chronic stressors. It helps not to activate repeated worries about problems that are far away at home or the civilian job. However, passive coping becomes harmful when acute stressors come up even though one also cannot control the actual stressors. At the point when additional stressful events occur, the individuals' capacity to ignore and distance themselves from these acute stressors seems to break down. Additionally, passive coping includes some behavioral responses that per se have a negative influence on health (e.g., Sapolsky, 2004). These behaviors include an unhealthy diet, increase of cigarette smoking and increase in alcohol consumption. Thus, when passive coping is seen as a behavioral style, individuals who tend to cope passively are also more prone to health problems. This has been reflected in

the general negative associations between passive coping and the health outcomes.

In terms of the actual strength of the three-way interaction regarding active coping, the low significance needs to be discussed. The interpretation of the results should be treated with care and more reported as a trend rather than an actual finding. One reason for this low higher-order effect may be due to assessment time of the different constructs. The present study assessed coping style at pre-deployment assuming that it has more the nature of a stable personality construct. However, in the literature, there is a debate about dispositional or situational coping tendencies (Carver, Scheier, & Weintraub, 1989). Even though some studies found coping to be a habitual way of dealing with stress irrespective of the situation (Carver & Scheier, 1994; Terry, 1994), other studies have shown that it can be adapted. For example, the transactional theory of stress and coping does not see coping as an enduring personality trait. Coping is rather characterized as a situative response that should never be valued without the reference to the context in which it is used (Cheng, 2001; Folkman et al., 1986). Thus, as coping was only assessed at pre-deployment, individuals may have changed their coping styles during deployment according to the specific situation they encountered. The coping styles assessed at pre-deployment therefore might not necessarily relate to the actual coping styles applied during deployment.

### 3.4.2. Limitations

For the present study, generally the same limitations apply as for Study 1 regarding generalizability issues (i.e., Reservists as a self-selected group) and the self-report nature of the data. Specifically, for the individual's coping responses there was a debate among researchers who were always critical whether people can recall their general way of coping with stress accurately or how much error and bias would be in coping reports (Todd, Tennen, Carney, Armeli, & Affleck, 2004). For example, a study conducted by Todd et al. (2004) compared the concordance between daily coping reports and retrospective reports of coping on a global trait scale and found weak concordance between the two. It was argued that when individuals fill out global trait measures they are refering to major life events, while in daily coping

reports the stressors people refer to are minor daily hassles. The present study assessed coping with a global dispositional coping scale (Todd et al., 2004). Thus, this trait measure might have been good enough to predict the way Reservists cope with the major transition from civilian live to active military life.

An additional limitation for the analyses of the present study was the interactions found all accounted for only 1% to 3% change in the explained variance. Adding the product term of the moderator into the regression equation did not remarkably reduce the model error. As M. G. Evans (1985) has argued, interaction effects in field studies are so difficult to find that even a 1% change of variance should be considered important. In comparison to optimally designed experiments, field studies are also at a disadvantage in terms of assessing the efficiency of higher order interaction terms (i.e., three-way interactions) as reported by McClelland and Judd (1993). In addition, $R^2$ should not be regarded as useful effect size indices for evaluating interactions in field research (McClelland & Judd, 1993). Still, in the present study, when an interaction became significant, its effect size (in terms of its $\beta$-weight) was small. However, even small effect sizes can play an important role in expanding theory (McFarlin & Rice, 1992). When interpreting the findings, it is important to consider that field studies are more likely to yield smaller effects because the overall model error is larger in field studies than experimental studies (McClelland & Judd, 1993). One reason for the relatively small effect size is the restriction of range in field experiments. In addition to the design-related range restriction, the selected sample is also responsible for a restriction of range on the variables. Reservists are a relatively young, trained, and healthy population unlikely, for example, to report large amounts of strain.

### 3.4.3. Implications and Future Directions

The results of the present study have implications in terms of personnel development issues. As can be seen, the influence of personal resources on the relationship between stressors and health outcomes is complex. There does not seem to be one personal attribute upon which individuals can always rely and for which they should be trained. Instead, it is critical for an individual to realize the nature of the situa-

tion he/she is facing. According to the controllability of stressors encountered, there are specific response styles which are appropriate. Therefore, people should rather be trained to analyze stressful situations and adapt their coping skills and resources (i.e., whether the problem is manageable and controllable or rather unavoidable and not influenceable). In fact, current stress management programs already successfully apply this flexible response approach. Individuals get taught how to analyze specific problems and from there decide if a problem-oriented strategy or a palliative strategy is more efficient to reduce the amount of stress (Kaluza, 2000). Besides learning how to feel more self-efficient and carry out control coping strategies, a person also needs to learn how to rely on these potential personal resources in a situation-specific way.

Future research should further consider the situation-specific effect of individual difference variables when analyzing resiliency constructs. For example, another individual difference variable introduced by Antonovsky (1987) is Sense of Coherence (SOC). SOC is defined as a global construct that expresses the extent to which one has an enduring feeling of confidence that one's internal and external environments are predictable and that there is a high probability that things will work out as well as can reasonably be expected. Thus, according to Antonovsky, a person with a high SOC is less likely to appraise a situation as stressful. However, the question whether coherence is generally stress reducing for stressful situations of all magnitude is still unclear. It might be that if a person high in SOC is confronted with an obviously uncontrollable situation, which is contrary to the person's cognitive schemata, that individual would experience a stronger disadvantage then if he or she had less SOC.

Still, there may be other constructs in resiliency research that actually make individuals more resistant to stress regardless of the situation, for example the concept of hardiness (Kobasa, Maddi, & Kahn, 1982). Hardiness means that a person is committed to find a meaningful purpose in life, believes that one can influence the environment and the outcomes of events, and believes that one can also learn from negative life experiences (Bonanno, 2004). The definition of hardiness implies that hardiness would drive an individual to take on a more rational life perspective, which allows a person to deal with any kind of stressor more effectively. So far, studies have found ameliorating effects even under high stressful and traumatic situations (e.g.,

Bartone, 1999). Thus, future research should focus on further resiliency constructs, which have the strength to transform potentially stressful situations into growth opportunities (Maddi, 2005). The advantage of finding individual resources that are independent of the stressor type is that then interventions could be planned to teach people how to develop increased stress resistance.

Therefore, more intervention studies on organizational health should be designed and evaluated in an applied setting to further understand whether situation-specific coping can actually be trained and also transferred effectively into the everyday job. These studies should specifically focus on the impact of both chronic and acute stressors as previous research has not directly been concerned with the issue of multiple stressor sources.

# 4. Study 3: The Role of Reciprocity

The previous studies (Study 1 and Study 2) have pointed towards the importance of finding means to reduce the influence of a variety of stressors on a persons' psychological well-being. As McEwen and Lasley (2004) pointed out, individuals are only able to bear stressful conditions under certain circumstances. Otherwise, their health will suffer. Another model in today's stress research that arrives at a similar conclusion is Siegrist's (1996a, 1996b) *Effort-Reward-Imbalance Model* (ERI; see Figure 4.1). However, Siegrist's stress framework is restricted to the analysis of the actual work environment. So far, by using the *Allostatic Load Model*, the two previous studies had focused on both, the Reservist's job-related and civilian environment and their impact on psychological well-being. By introducing Siegrist's ERI Model the focus was shifted towards the influence of the actual military work environment on activated Reservists' long-term health outcomes.

Obviously, the job of a Reservist has a high potential for a variety of stressors (see Study 1). These stressors require a Reservist to put a lot of hard work into the military job. Not only do Reservists need to make sacrifices in terms of leaving behind their loved ones and potentially risking their own lives on active duty, but they are also required to put a lot of effort into their daily military tasks in order to overcome all potential stressors. A lot of research has found a negative impact of work-related stressors on workers' health (e.g., Dewe & Brook, 2000). However, these stressors could be overcome by resources offered through the organization. For example, psychological contract theory has identified reciprocity as one important workers' resource (Dabos & Rousseau, 2004). Dabos and Rousseau referred to reciprocity as "the degree of agreement about the reciprocal exchange, given that commitments or contributions made by one party obligate the other to provide an appropriate return" (p. 53). In case of Reservists it is important to consider the question what Reservists

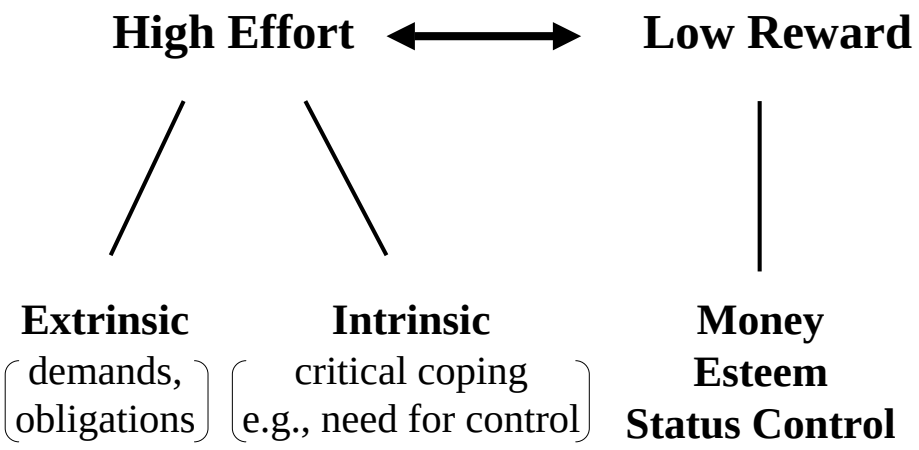


*Figure 4.1.* The Effort-Reward Imbalance Model (ERI; Siegrist, 1996a, 1996b).

see as an adequate return for their commitment and contribution to their military job and what would be the consequences of an imbalance between contribution and returns. This question could be approached by employing Siegrist's Effort-Reward Imbalance (ERI) Model.

## 4.1. The Effort-Reward Imbalance Model (ERI)

Siegrist (1996a, 1996b) posits that being employed plays a crucial and significant role in people's lives. The beneficial effects that are derived from work are a sense of belonging to an important group, contributing one's performance to the workplace and consequently obtaining benefits. Thus, through the individual work role, a person can satisfy self-regulatory needs (e.g., self-efficacy, self-esteem, or self-integration; van Vegchel, de Jonge, Bosma, & Schaufeli, 2005). Yet, these benefits depend on reciprocity. If a person puts effort in a task, it is expected the person will be rewarded for his or her effort. A failure of the society (or specifically of the employer/organization) to distribute appropriate rewards causes a state of imbalance between the costs the individual has and the gains that he/she derives from his/her

efforts. Lack of reciprocity then leads to feelings of threat, anger and depression (Siegrist, 1996a, 1996b). The consequences of missing rewards also parallel an early behavioral approach to depression by Lewinsohn and colleagues (e.g., Lewinsohn & Graf, 1973; Lewinsohn & Shaffer, 1971; MacPhillamy & Lewinsohn, 1974) which assumes that depression is linked with reduced positive reinforcement (i.e., reward) following an individual's action. Siegrist's idea of reciprocity is represented through the components of effort and reward in the model.

### 4.1.1. The ERI Model Components

#### Effort

Regarding the first model component of effort, Siegrist (1996b) defines two sources of high work effort. First, he identifies extrinsic reasons why workers put a lot of effort into their job tasks. These reasons are typically the explicit obligations or demands expected of an employee and are contingent upon monetary reward. One could also talk about the situational characteristics that lead to effort on the job.

Second, Siegrist identifies intrinsic reasons why individuals invest personal resources into the job. These intrinsic reasons exist independent of an expected reward and are personal in nature. The intrinsic effort may be related to individual preferences in coping strategies. For example, it may be that some people invest a lot of time and energy in a demanding task because they enjoy the feeling of being in control of their work output (i.e., need for control). Others might have specific attribution styles regarding their successes. Generally, intrinsic effort has been defined as a rather negative personal characteristic related to the cognitive, emotional and behavioral patterns of a Type A personality, consisting of irritability, and inability to withdraw from work due to a strong ambition. This constant investment of effort would finally lead to exhaustion and illness (van Vegchel et al., 2005).

However, an alternative and more positive possibility for the phenomena that some people invest their energy into jobs without an explicit reward might be their identification and personal involvement with some key aspects of the self in the job and thus the unwillingness to detach from job demands (Siegrist, 1996a). This last reason might be equally called job engagement. Workers develop job engagement

when they perceive their activity or organization as having the potential to satisfy their psychological needs (Brown, 1996). In the operationalization of intrinsic effort, the present study holds on to this postitive representation of intrinsic effort. Job engagement relates to the extent to which job performance affects a person's self-esteem and to the importance of work in a person's self-image (Brown, 1996).

### Reward

Regarding the second model component of rewards, Siegrist (1996a, 1996b) identified money, esteem and status control as rewarding transmitter systems (at least for industrialized nations). For the operationalization of the ERI Model it has been considered fruitful to look at these different reward transmitters separately, in order to be able to determine the specific impact of each type of reward. This is of particular relevance for organizations which plan interventions based on the ERI Model. The differentiated perspective on the rewards may reveal different pathways to reduced effort-reward imbalance.

In terms of money, in our society it is expected that higher effort will be reflected in higher payment. Similarly, a job which requires high effort and responsibility is generally regarded as worthier and thus leads to the expectation of increased esteem and appreciation from coworkers, supervisors and society in general. Especially within the organization, supervisor esteem has been found to act as a relevant factor for reducing unfairness perceptions among employees and thus also to ameliorate adverse health effects due to reduced ERI (Cole & Latham, 1997; Greenberg, 2006).

Finally, and maybe most importantly, the individual expects that high effort will be rewarded through high status control. This means individuals expect that their effort will have an influence on their job promotion and career opportunities, job stability, security and/or job autonomy. One way to measure this status control is to assess the degree to which individuals perceive their work environment to have procedural justice. Colquitt (2001) defines procedural justice as the perceptions of justice surrounding the process that leads to a decision outcome. For example, an organization high in procedural justice has regulations about how to distribute rewards among employees that are regarded as fair. Thus, workers may perceive an

organization that is high in procedural justice as an extrinsic benefit that offers the opportunity for reciprocity, such that high effort will be rewarded with increased status control.

### 4.1.2. Research on the ERI Model

The ERI Model is seen as one of the most important developments within occupational health psychology as it brings a deep understanding of the "human-working interaction" (Johnson, 1996, p. 7). The model has generated a large research effort (for an overview see Tsutsumi & Kawakami, 2004; van Vegchel et al., 2005). Similar to the *Allostatic Load Model*, the ERI Model has been used to predict health risks. For example, ERI studies of health risks have included coronary heart disease or cardiovascular risk factors (Kuper et al., 2002; Peter et al., 1998; Siegrist, 1996a, 1996b), alcohol dependence (Head et al., 2004), self-reported physical and mental health (Godin et al., 2005; Kuper et al., 2002), and depressive symptoms (von dem Knesebeck & Siegrist, 2003; Watanabe et al., 2004).

The way of how the ERI Model has been interpreted and how the model components of effort and reward were operationalized has changed over the years (van Vegchel et al., 2005). Specifically, the role of the intrinsic effort component has gained more significance. This change within the model has resulted through a restatement of the ERI Model by Siegrist (1999) himself (see Figure 4.2).

During the first years of the ERI Model introduction until today, researchers set the main focus of analyses on the imbalance of the extrinsic effort component and the reward component (van Vegchel et al., 2005). The prediction was that employees are under greatest risk of health problems when they experience both high extrinsic effort and low reward at the same time, than when they would only experience either high effort or low reward. This main postulation of the ERI model has been called the *extrinsic effort-reward imbalance hypothesis*.

Originally, intrinsic effort, as a personal characteristic, was only regarded as a subcomponent of the overall effort (see Figure 4.1). However, in the current interpretation of the ERI Model (see Figure 4.2) intrinsic effort became an independent concept that was labeled *overcommitment*. Overcommitment has a similar negative

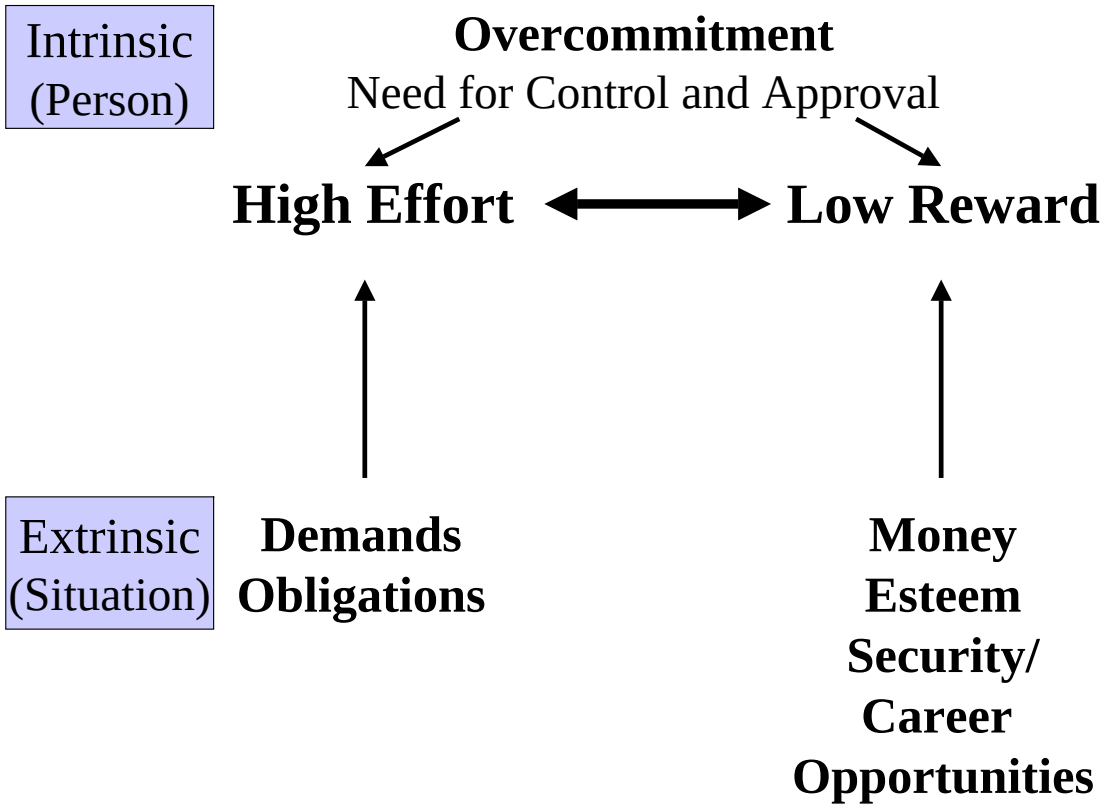


*Figure 4.2.* The revised *Effort-Reward Imbalance Model* (Siegrist, 1999).

connotation like Siegrist's (1996b) orignial interpretation of intrinsic effort. Being involved in work all the time leads to exhaustion in the long run. The continued exaggerated effort may lead to decreased health even in the absence of extrinsic effort-reward imbalance. This main effect of intrinsic effort has been called the *intrinsic overcommitment hypothesis*.

In addition to function as a main effect variable on the health outcome, overcommitment was also given a moderator function on the effort-reward imbalance interaction (Siegrist, 1999). The moderator role of overcommitment has been labeled the *interaction hypothesis* (van Vegchel et al., 2005). The reason behind this interaction hypothesis is the view that an individual's personal characteristic of overcommitment (i.e., intrinsic effort) influences the perception of both extrinsic efforts and rewards. Highly overcommitted individuals easily underestimate job demands and overestimate their abilities. That means, an individual who is overcommitted and at the same time experiences an effort-reward imbalance on the job, is under the highest risk of decreased health.

Due to this steady development of the ERI Model interpretation, in the literature one can find a myriad of different operationalizations of the model and the single ERI Model components, all of which make it quite difficult to compare research findings. For example, past research has often treated extrinsic and intrinsic effort as having separate effects on health outcomes (e.g., Godin et al., 2005; Kuper et al., 2002; Peter, Siegrist, Hallqvist, Reuterwall, & Theorell, 2002; Steptoe, Siegrist, Kirschbaum, & Marmot, 2004). Some studies have included only one effort aspect of the model. Kobayashi and colleagues (Kobayashi, Hirose, Tada, Tsutsumi, & Kawakami, 2005) only looked at extrinsic effort, whereas Head et al. (2004) only assessed intrinsic effort. Other studies have looked at the degree to which individuals perceive their efforts to be rewarded. For example, von dem Knesebeck and Siegrist (2003) specifically developed a measure to directly assess reciprocity. Because the ERI Model has not been previously examined with military personnel and in order to test the complete model hypotheses, the present study included both extrinsic and intrinsic aspects of effort.

In terms of the reward component of the model, the ERI Model has been criticized for not distinguishing between extrinsic and intrinsic rewards (Kasl, 1996). Extrinsic

rewards are given to a person from an outside source (i.e., the company, the supervisor). Siegrist's examples of rewards contain the one classic extrinsic reward, which is the individual's salary. Intrinsic rewards are those which originate within the individual and stem from the job itself. An example for an intrinsic reward may be the meaning individuals derive from their job. It might be that people who are forced to put a lot of effort into their job but are not intrinsically motivated might not care about meaningfulness as a reward but may care a great deal about the money. In contrast, intrinsically motivated individuals might not care about the financial reward as long as they get a personal reward out of their job (e.g., meaningfulness). Consequently, the present study tested the ERI Model in a new way by explicitly including both extrinsic and intrinsic rewards Reservists may experience on their job.

In terms of outcomes, the ERI Model describes the balance between effort and reward in relation to employee health. Several studies on the ERI Model have found depressive symptoms to be associated with high effort and low reward (Godin & Kittel, 2004; Pikhart et al., 2004; von dem Knesebeck & Siegrist, 2003; Watanabe et al., 2004), and so depressive symptoms are regarded as a useful measure for the model. Depressive symptoms are useful not only because of their association with reduced job performance (Motowidlo et al., 1986) but also because of their proposed link to chronic disease (Pikhart et al., 2004). Thus, for the purpose of the present study depressive symptoms were selected as the key outcome variable. Additionally, psychological symptoms were used as a more global measure of psychological health problems.

Besides clarifying the model's components, the issue of quantifying the ERI Model needs to be addressed. The predictions of the ERI Model have been analyzed in a variety of ways. For example, previous research analyzed the ERI Model through the use of logistic regression analyses, dichotomization (effort: yes, no; reward: yes, no) and categorization of study variables (high effort and low reward quartile vs. low effort and high reward quartile, etc.). The independent variables are traditionally operationalized as a difference score or a ratio of effort/reward calculated with different formulas (e.g., Godin et al., 2005; Head et al., 2004; Kuper et al., 2002; Ostry, Kelly, Demers, Mustard, & Hertzman, 2003; Peter et al., 1998). Following these

procedures, the cutoff points are set rather arbitrarily as they do not rely neither on naturally nor clinically based tresholds. Additionally,the use of these types of approaches in analyzing the ERI Model may result in the loss of important information that comes from the continuous nature of the data. Trying to build interaction terms through procedures of categorization sometimes even failed to produce significant results (e.g., Siegrist, 1996b). Thus, in the present study all variables regarding the ERI Model were treated as continuous variables.

### 4.1.3. ERI Hypotheses

Regarding the extrinsic effort-reward imbalance hypothesis, which has been frequently confirmed in previous research, the present study added an intrinsic reward component to the ERI Model including its respective interaction with intrinsic effort. A measure assessing Reservists' perceived pride, worth and meaning of their job was additionally examined in order to detect a possible alternative compensation for high intrinsic effort. According to the first ERI Model hypothesis extended with an intrinsic reward the first hypothesis was stated as follows:

> *Hypothesis 3a - Extrinsic/Intrinsic Effort-Reward Imbalance*: High effort in combination with low reward leads to depressive symptoms and increased general psychological health symptoms in Reservists over and above the main effects of high effort or low reward.

Regarding the intrinsic effort hypothesis, the present study relied on a positive interpretation of intrinsic effort in the sense of job engagement. The resource for intrinsic job effort is regarded to stem from a positive attitude towards the job, lacking the negative components of the overcommitment construct like, for example, irritability. Thus, the hypothesized main effect of intrinsic effort (i.e., job engagement) on psychological health outcomes is expected to be positive as generally, job engagement is not regarded to be exhaustive under normal job conditions. Moreover, a meta-analytic result did not find negative side effects of job engagement on variables like health complaints or stress (Brown, 1996). Thus, according to the second ERI Model hypothesis the following was stated.

> *Hypothesis 3b - Intrinsic Effort*: High intrinsic effort (i.e., job engagement) leads to reduced depressive symptoms as well as reduced general psychological health symptoms in Reservists.

Regarding the interaction hypothesis in the present study an exacerbating effect of intrinsic effort was expected. Even though intrinsic effort has a positive connotation, the construct of job engagement also implies a strong personal affiliation to an individual's job as well as a high personal identification and embeddedness of one's self-concept into the job (Brown, 1996). In this regard, the perception of an ERI might be especially threatening to the individual's self-concept because of high job engagement. Thus, according to the last ERI Model hypothesis the following was stated:

> *Hypothesis 3c - Interaction*: Reservists who report intrinsic effort combined with effort-reward imbalance report increased depressive symptoms and general psychological health symptoms at post-deployment.

In following the aim of developing stress models for Reservists, Figure 4.3 presents a comprehensive stress framework for the ERI Model. In addition to the ERI Model components of effort and reward, Reservists' pre-deployment stress burden was included. This approach was similar to that of the previous studies (Study 1 and 2) and accounted for the fact that pre-existing psychological health problems might effect stress perceptions during deployment and thus directly influence the amount of psychological health problems experienced at post-deployment. Figure 4.3 diagrams the direct paths to psychological health problems of intrinsic effort, extrinsic effort, extrinsic reward, intrinsic reward, and pre-deployment psychological stress burden. Furthermore, as the major part of the model, the interaction effect of extrinsic/intrinsic effort and extrinsic/intrinsic reward as well as the three-way interaction of intrinsic effort and ERI on post-deployment health problems was included.

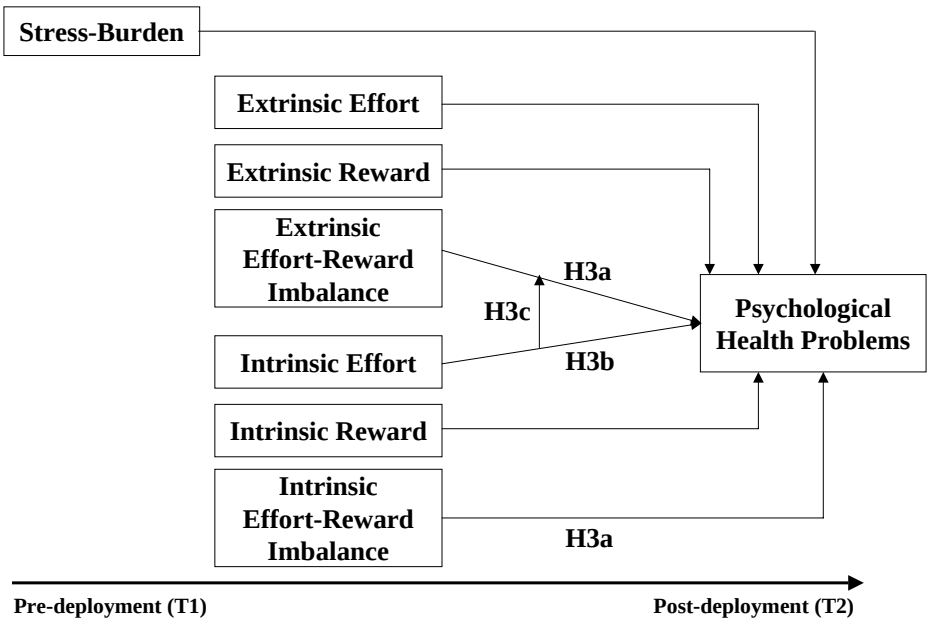


*Figure 4.3.* Comprehensive job stress model of *Effort-Reward Imbalance* for Reservists. The model proposes a moderation effect of extrinsic effort and extrinsic reward on psychological health problems as well as a moderation effect of intrinsic effort and intrinsic reward. These two moderations represent hypothesis 3a (H3a). Furthermore, the model postulates a direct effect of intrinsic effort on psychological health problems, which represents hypothesis 3b (H3b). Hypothesis 3c (H3c) is represented by a three-way interaction of intrinsic effort, extrinsic effort and extrinsic reward on the outcome.

## 4.2. Method

### 4.2.1. Participants and Procedure

The sample of the present study consisted of 543 reserve component Soldiers (98.6% National Guard, 0.4% Army Reserve, and 1% Active Guard Reserve). The majority of the sample was male (94%) with a mean age of 31 years (SD = 9.02). Most participants identified themselves as Caucasian (88.3%, vs. 6.5% as African American, 3.3% as Hispanic, and 1.9% as other) with the majority being enlisted Soldiers (96.1%, vs. 3.7% Commissioned Officers, and 0.2% Warrant Officers). The procedure of this data collection equals the procedures of Study 1 and 2, as the present sample also stemmed from the same dataset.

### 4.2.2. Measures

The measures for Study 3 partly rely on the same scales already used in Study 1 and 2. These scales include the GHQ-12 (Goldberg, 1972) and PHQ-9 (Kroenke et al., 2001) both at T1 for pre-deployment stress burden as well as at T2 for assessing depressive symptoms and general psychological health symptoms.

*Effort*: Regarding the hypothesis related to the ERI Model, positive intrinsic effort was operationalized by job engagement at T1 (Britt, 1998). On this four-item scale Reservists had to indicate how much they agree to statements like:*How well I do in my job matters a great deal to me.* The response options ranged from 1 = *strongly disagree* to 5 = *strongly agree.* Extrinsic effort was operationalized as organizational impediments at T2 (see study 1a, Spector & Jex, 1998).

*Reward*: The extrinsic reward part of the ERI Model was assessed at T2 by measuring the financial situation of the Reservists (i.e., money), assessing the perception of social reward (i.e., esteem), and by asking about Reservists' perception of procedural justice (i.e., status control). The response options ranged on five-point scales from 1 = *strongly disagree* to 5 = *strongly agree* for all reward measures.

The extrinsic reward of financial consequences was assessed with three items (Durand & Bliese, 2001) asking the Soldiers how much financial strain had been caused

by the deployment. A sample item was: *the activation caused me financial difficulties.*

The extrinsic reward of social recognition was assessed with four items (Durand & Bliese, 2001) asking Reservists to rate, whether they received positive feedback when they successfully completed a task. A sample item was:*My company commander told Soldiers when they had done a good job.*

The last extrinsic reward component of procedural justice was assessed with Colquitt's (2001) procedural justice subscale adapted for this study. Reservists indicated their agreement on five items like: *I was able to express my views about the policies/procedures surrounding the deployment.*

Intrinsic reward was assessed with three items regarding Reservists' satisfaction with what they had achieved by their efforts during their mission to Europe (Durand & Bliese, 2001). The items were: *What I did in Europe was worthwhile*; *I am an important part of the Army National Guard Company*; *I am proud to be in the Army National Guard.* The items were rated on a five-point scale (1 = *strongly disagree*, 5 = *strongly agree*). Table 4.1 provides a summary of all scales used in Study 3.

### 4.2.3. Analytic Strategy

As was the case for Studies 1 and 2, all independent variables were z-standardized to prevent multicollinearity and facilitate model estimation due to the hypothesized moderation effects (Aiken & West, 1991). Since the values of the outcome measures did not have a relevant value by themselves (e.g., like money or temperature), they were also standardized for easier result interpretation. All descriptive and regression analyses were conducted in R 2.1.0 (R Development Core Team, 2005).

The approach for analyzing hypothesis 3a concerning the extrinsic/intrinsic ERI hypothesis was similar to that of Study 2 by using hierarchical moderated regressions. Pre-deployment stress burden at T1 was entered in the first step, followed by all effort and reward variables in the second block. Finally, the effort and reward interaction terms were entered in the last block. Different from the approach to the previous studies, separate analyses were conducted for predicting depressive symptoms and general psychological symptoms at T2. One reason for the individ-

*Table 4.1.* Measures in Study 3

| Scales | Items | Reference |
|---|---|---|
| **Pre-Deployment Stress Burden T1** | | |
| General Health Questionnaire | 12 | Goldberg (1972) |
| Personal Health Questionnaire | 9 | Kroenke et al. (2001) |
| **Extrinsic Effort T2** | | |
| Organizational Impediments | 10 | Spector and Jex (1998) |
| **Intrinsic Effort T1** | | |
| Job Engagement | 4 | Britt (1998) |
| **Extrinsic Reward T2** | | |
| Financial Reward | 3 | Durand and Bliese (2001) |
| Social Reward | 4 | Durand and Bliese (2001) |
| Justice Reward | 5 | Colquitt (2001) |
| **Intrinsic Reward T2** | | |
| Pride, Worth, and Meaning | 3 | Durand and Bliese (2001) |
| **Psychological Health Outcomes T2** | | |
| General Health Questionnaire | 12 | Goldberg (1972) |
| Personal Health Questionnaire | 9 | Kroenke et al. (2001) |

ual treatment of the outcome variables lay in the more simple structure of the ERI model. Another reason for separately analyzing the impact of imbalance on depressive symptoms and general psychological health symptoms was that this apporach would allow to compare the results of the present study with previous research that looked specifically on depression as an outcome of effort-reward imbalance.

Hypothesis 3b was analyzed by conducting two simple regressions of intrinsic effort on the two health outcomes. The respective health variable at T1 was included as a control variable.

To test the interaction hypothesis 3c, an additional step was added to the regression procedure of analyzing hypothesis 3a. In that additional step three-way interactions were added, in which each of the three extrinsic effort-reward imbalances were combined with intrinsic effort.

## 4.3. Results

### 4.3.1. Descriptive Statistics

Table 4.2 provides means, standard deviations and reliabilities of all study variables from study 3. Variables' correlations are given in Table 4.3.

### 4.3.2. Regression Analyses

#### Results for the Extrinsic/Intrinsic ERI Hypothesis 3a

In order to test for hypothesis 3a, a hierarchical regression approach was used, similar to the regression analyses for Study 2. Two separate models were conducted for the outcomes; the first model analyses the impact of effort-reward imbalance on psychological health symptoms and the second model analyses the impact of effort-reward imbalance on depressive symptoms. Although pre-deployment stress burden is not explicitly included in Siegrist's ERI Model, the present study adds both psychological health symptoms and depressive symptoms at pre-deployment to the model in the first step in order to use them as the baseline for Reservists' psychological well-being.

*Table 4.2.* Means, Standard Deviations, and Cronbach's $\alpha$ of Variables in Study 3

| Variable | Mean | SD | $\alpha$ |
|---|---|---|---|
| **Pre-Deployment Stress Burden T1** | | | |
| Psychological Health Symptoms T1 | 1.20 | 0.38 | .74 |
| Depressive Symptoms T1 | 1.29 | 0.41 | .88 |
| **Effort** | | | |
| Extrinsic Effort | 2.08 | 0.92 | .92 |
| Intrinsic Effort | 4.28 | 0.54 | .84 |
| **Reward** | | | |
| Extrinsic Financial Reward | 3.34 | 0.96 | .87 |
| Extrinsic Social Reward | 3.19 | 0.86 | .74 |
| Extrinsic Justice Reward | 2.61 | 0.85 | .90 |
| Intrinsic Reward | 3.66 | 0.84 | .72 |
| **Psychological Health Outcomes T2** | | | |
| Psychological Health Symptoms T2 | 1.29 | 0.36 | .78 |
| Depressive Symptoms T2 | 1.30 | 0.51 | .92 |

*Table 4.3.* Correlations of Variables in Study 3.

| Variable | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 01. Psychological Health Symptoms T1 | - | | | | | | | | | |
| 02. Depressive Symptoms T1 | .42 | - | | | | | | | | |
| 03. Extrinsic Effort | .08 | .14 | - | | | | | | | |
| 04. Intrinsic Effort | -.22 | -.08 | -.04 | - | | | | | | |
| 05. Extrinsic Financial Reward | -.05 | -.12 | -.20 | -.03 | - | | | | | |
| 06. Extrinsic Social Reward | -.04 | -.08 | -.32 | .03 | .07 | - | | | | |
| 07. Extrinsic Justice Reward | -.05 | -.10 | -.33 | -.10 | .11 | .46 | - | | | |
| 08. Intrinsic Reward | -.13 | -.18 | -.23 | .15 | .09 | .30 | .33 | - | | |
| 09. Psychological Health Symptoms T2 | .29 | .25 | .17 | -.11 | -.20 | -.24 | -.16 | -.31 | - | |
| 10. Depressive Symptoms T2 | .19 | .43 | .27 | .00 | -.24 | -.19 | -.17 | -.26 | .47 | - |

*Note.* Critical values: $p < .05$ at $|r| = .09$ for two-sided tests;
$p < .01$ at $|r| = .12$ for two-sided tests.

Table 4.4 provides regression results for predicting general psychological health symptoms. As can be seen from the table (see Table 4.4), effort-reward imbalance is not predictive for any psychological health symptoms at post-deployment. Besides psychological symptoms at pre-deployment, only intrinsic and extrinsic financial and social reward had main effects on the outcome variable. Specifically, financial reward has a positive impact on Reservists' psychological well-being. Thus, the more Reservists perceive to be financially rewarded for their deployment the less symptoms they report. Similarly, social reward had a positive influence on psychological health symptoms. Reservists who reported to receive positive feedback from their supervisors after a successfull mission showed less health symptoms. Finally, Reservists who reported feelings of pride and meaning about the job they had to perform also reported less psychological symptoms.

Table 4.5 provides the regression results for predicting depressive symptoms at post-deployment. Extrinsic effort as well as extrinsic financial and intrinsic reward had main effects on the outcome. As it was the case for predicting general psychological health symptoms, also the amount of pre-deployment depressive symptoms was predictive of depressive symptoms at post-deployment.

Regarding the interaction effect, effort-reward imbalance was predictive of post-deployment depressive symptoms for two reward components. Specifically, the imbalance of extrinsic effort (i.e., organizational impediments) and extrinsic financial as well as social reward yielded significant interactions in predicting post-deployment depressive symptoms. The interactions are plotted in Figures 4.4 and 4.5

As can be seen from the interaction plot in Figure 4.4, Reservists experiencing high effort while at the same time perceiving to receive low financial reward reported the highest depressive symptoms at post-deployment. Similarly, Reservists reported the highest depressive symptoms, when they did not receive social reward for their high effort (Table 4.5).

To summarize, the results of the present analyses partially supported hypothesis 3a. The experience of effort-reward imbalance was specifically predictive of post-deployment depressive symptoms but not of general psychological symptoms. The newly introduced intrinsic effort-reward imbalance interaction did not result in a significant interaction. Only extrinsic effort combined with either financial reward

*Table 4.4.* Hierarchical Regression Analysis for Hypothesis 3a Predicting General Psychological Health Symptoms

| Variables | $\beta$ | $SE$ | $\Delta R^2$ | $p$ |
|---|---|---|---|---|
| Step 1 | | | .09 | .00 |
| Psychological Health Symptoms T1 | .25 | .04 | | .00 |
| Step 2 | | | .11 | .00 |
| Extrinsic Effort T2 | .04 | .04 | | .36 |
| Intrinsic Effort T1 | -.02 | .04 | | .70 |
| Extrinsic Financial Reward T2 | -.16 | .04 | | .00 |
| Extrinsic Social Reward T2 | -.15 | .05 | | .00 |
| Extrinsic Justice Reward T2 | -.01 | .05 | | .78 |
| Intrinsic RewardT2 | -.22 | .04 | | .00 |
| Step 3 | | | .00 | .54 |
| Extrinsic Effort × Financial Reward | .03 | .04 | | .47 |
| Extrinsic Effort × Social Reward | -.02 | .04 | | .63 |
| Extrinsic Effort × Justice Reward | .05 | .04 | | .16 |
| Intrinsic Effort × Intrinsic Reward | .02 | .04 | | .67 |

*Note.* Adjusted $R^2 = .20$; $F(11, 531) = 13.42$, $p < .001$

*Table 4.5.* Hierarchical Regression Analysis for Hypothesis 3a Predicting Depressive Symptoms

| Variables | $\beta$ | $SE$ | $\Delta R^2$ | $p$ |
|---|---|---|---|---|
| Step 1 | | | .19 | .00 |
| Depressive Symptoms T1 | .36 | .04 | | .00 |
| Step 2 | | | .08 | .00 |
| Extrinsic Effort T2 | .10 | .04 | | .02 |
| Intrinsic Effort T1 | .06 | .04 | | .13 |
| Extrinsic Financial Reward T2 | -.14 | .04 | | .00 |
| Extrinsic Social Reward T2 | -.04 | .04 | | .31 |
| Extrinsic Justice Reward T2 | .00 | .04 | | .91 |
| Intrinsic RewardT2 | -.15 | .04 | | .00 |
| Step 3 | | | .02 | .00 |
| Extrinsic Effort × Financial Reward | -.11 | .03 | | .00 |
| Extrinsic Effort × Social Reward | -.07 | .03 | | .04 |
| Extrinsic Effort × Justice Reward | .05 | .04 | | .15 |
| Intrinsic Effort × Intrinsic Reward | .03 | .03 | | .37 |

*Note.* Adjusted $R^2 = .29$; $F11, 531) = 20.78$, $p < .001$

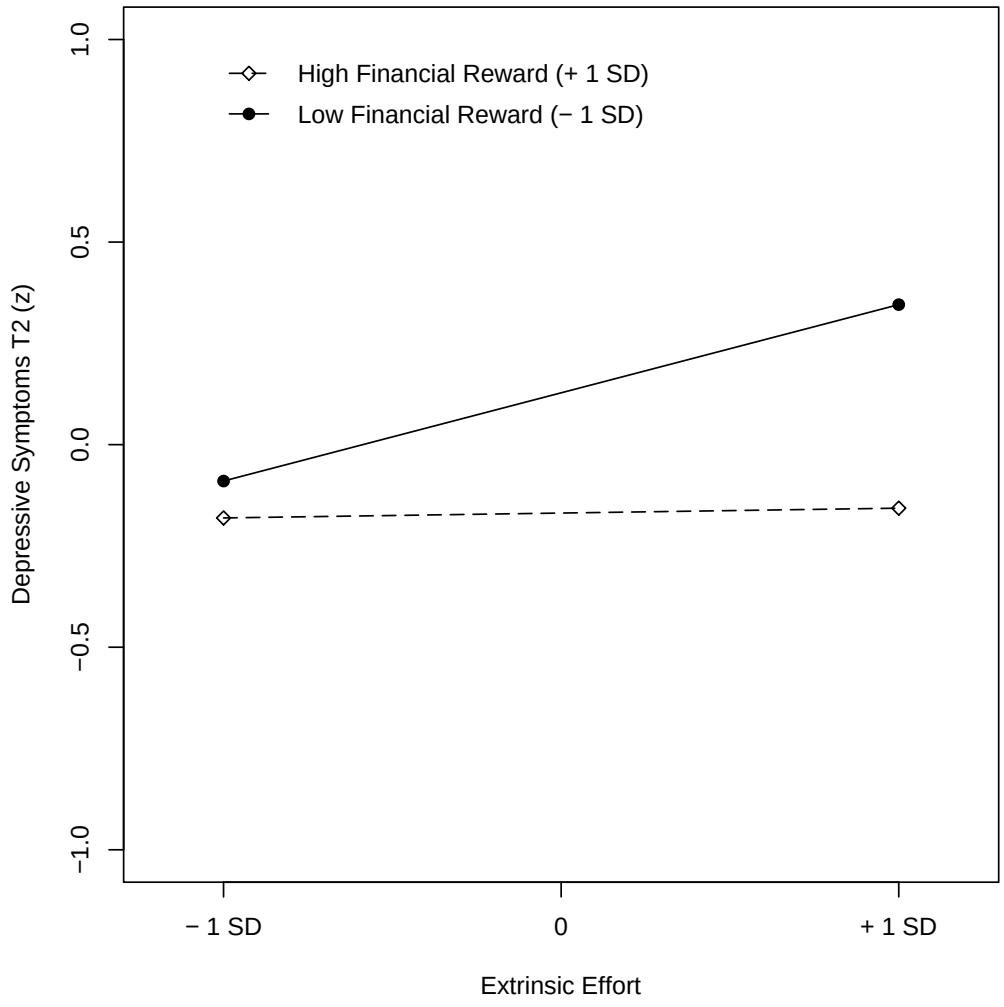


*Figure 4.4.* Extrinsic financial reward as the moderator of the relationship between deployment effort and depressive symptoms at post-deployment.

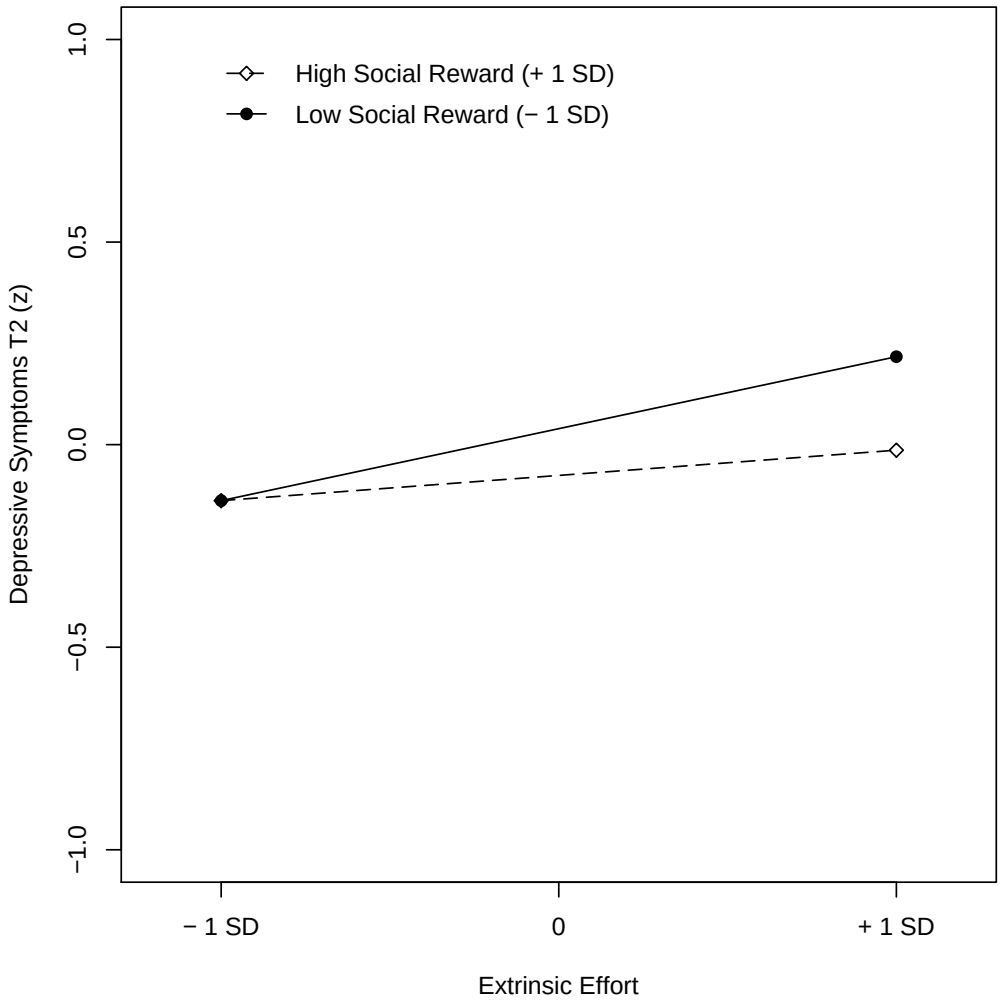


*Figure 4.5.* Extrinsic social reward as the moderator of the relationship between deployment effort and depressive symptoms at post-deployment.

*Table 4.6.* Regression Analysis for Hypothesis 3b Predicting General Psychological Health Symptoms

| Variables | $\beta$ | $SE$ | $p$ |
|---|---|---|---|
| General Psychological Health Symptoms T1 | .29 | .04 | .00 |
| Intrinsic Effort T1 | -.04 | .04 | .29 |

*Note.* Adjusted $R^2 = .09$; $F(2, 540) = 26.34$, $p < .001$

*Table 4.7.* Regression Analysis for Hypothesis 3b Predicting Depressive Symptoms

| Variables | $\beta$ | $SE$ | $p$ |
|---|---|---|---|
| Depressive Symptoms T1 | .44 | .04 | .00 |
| Intrinsic Effort T1 | .04 | .04 | .36 |

*Note.* Adjusted $R^2 = .19$; $F(2, 540) = 62.79$, $p < .001$

or social reward were predicting an increase in depressive symptoms. Instead, an imbalance between extrinsic effort and justice reward was not predictive of the health outcomes.

### Results for the Intrinsic Effort Hypothesis 3b

The regression results for the intrinsic effort hypothesis are presented in Tables 4.6 and 4.7. The intrinsic effort hypothesis was not supported for the present study as intrinsic effort was not predictive of any health outcomes, when the pre-deployment health status was controlled for.

### Results for the Interaction Hypothesis 3c

The results of the final hypothesis 3c concerning the three-way interactions of ERI and intrinsic effort are presented in Tables 4.8 and 4.9. Regarding the prediction of general psychological health symptoms, none of the possible three-way interactions turned out to be significant (see Table 4.8). Similar to the regression results

of hypothesis 3a, in this analyses only the same main effects remained significant in predicting general psychological health symptoms at post-deployment. These variables included extrinsic financial reward, extrinsic social reward, intrinsic reward and pre-deployment psychological health symptoms.

Also regarding the prediction of depressive symptoms, when adding the three-way interaction terms the basic results from hypothesis 3a remained. That is, the same main effects occured on post-deployment depressive symptoms (i.e., pre-deployment depressive symptoms, extrinsic effort, extrinsic financial reward, and intrinsic reward). The extrinsic effort-financial reward interaction also remained significant. However, the extrinsic effort- social reward interaction was only significant at the .10 level.

In terms of the interaction hypothesis on depressive symptoms, one of the added three-way interactions yielded a significant result (see Table 4.9). Intrinsic effort in combination with ERI due to little financial reward had a significant impact on depressive symptoms at post-deployment. All other three-way interactions were not significant in relation to the whole set of interactions. The significant interaction was graphed in Figure 4.6. As can be seen from Figure 4.6 in general, Reservists who experienced a lack of financial reward also report more depressive symptoms. Financial reward did not seem to matter only in the case of individuals who engaged in high intrinsic effort but who were not confronted with any additional extrinsic effort. However, individuals high in intrinsic effort who were required to additionally provide some effort due to external organizational reasons while experiencing to be not sufficiently rewarded in monetary terms, reported the highest amount of depressive symptoms at post-deployment.

To summarize, the results of the last regression analyses partially supported hypothesis 3c regarding the interaction effect. The perception of extrinsic effort-reward imbalance in combination with personal intrinsic effort was specifically predictive of post-deployment depressive symptoms but not of general psychological symptoms. However, only the imbalance between extrinsic effort combined with financial reward was predicting an increase in depressive symptoms for individuals with high intrinsic effort. All other possible combinations of ERI with intrinsic effort were not predictive of the psychological health outcomes.

*Table 4.8.* Hierarchical Regression Analysis for Hypothesis 3c Predicting General Psychological Health Symptoms

| Variables | $\beta$ | $SE$ | $\Delta R^2$ | $p$ |
|---|---|---|---|---|
| Step 1 | | | .09 | .00 |
| Psychological Health Symptoms T1 | .26 | .04 | | .00 |
| Step 2 | | | .11 | .00 |
| Extrinsic Effort T2 | .04 | .04 | | .42 |
| Intrinsic Effort T1 | -.04 | .04 | | .42 |
| Extrinsic Financial Reward T2 | -.16 | .04 | | .00 |
| Extrinsic Social Reward T2 | -.13 | .05 | | .00 |
| Extrinsic Justice Reward T2 | .00 | .05 | | .98 |
| Intrinsic RewardT2 | -.21 | .04 | | .00 |
| Step 3 | | | .00 | .54 |
| Extrinsic Effort × Financial Reward | .03 | .04 | | .49 |
| Extrinsic Effort × Social Reward | -.01 | .04 | | .86 |
| Extrinsic Effort × Justice Reward | .05 | .04 | | .21 |
| Intrinsic Effort × Intrinsic Reward | .03 | .04 | | .49 |
| Step 4 | | | .00 | .16 |
| Intrinsic Effort × Financial ERI | -.05 | .04 | | .15 |
| Intrinsic Effort × Social ERI | .03 | .03 | | .40 |
| Intrinsic Effort × Justice ERI | -.06 | .04 | | .14 |

*Note.* Adjusted $R^2 = .20$; $F(14, 528) = 10.95$, $p < .001$

*Table 4.9.* Hierarchical Regression Analysis for Hypothesis 3c Predicting Depressive Symptoms

| Variables | $\beta$ | $SE$ | $\Delta R^2$ | $p$ |
|---|---|---|---|---|
| Step 1 | | | .19 | .00 |
| Depressive Symptoms T1 | .37 | .04 | | .00 |
| Step 2 | | | .08 | .00 |
| Extrinsic Effort T2 | .09 | .04 | | .03 |
| Intrinsic Effort T1 | .01 | .04 | | .81 |
| Extrinsic Financial Reward T2 | -.14 | .04 | | .00 |
| Extrinsic Social Reward T2 | -.02 | .04 | | .58 |
| Extrinsic Justice Reward T2 | -.02 | .04 | | .72 |
| Intrinsic RewardT2 | -.13 | .04 | | .00 |
| Step 3 | | | .02 | .00 |
| Extrinsic Effort × Financial Reward | -.10 | .03 | | .00 |
| Extrinsic Effort × Social Reward | -.06 | .03 | | .09 |
| Extrinsic Effort × Justice Reward | .05 | .04 | | .17 |
| Intrinsic Effort × Intrinsic Reward | .05 | .03 | | .15 |
| Step 4 | | | .02 | .00 |
| Intrinsic Effort × Financial ERI | -.13 | .03 | | .00 |
| Intrinsic Effort × Social ERI | .00 | .03 | | .94 |
| Intrinsic Effort × Justice ERI | -.06 | .04 | | .16 |

*Note.* Adjusted $R^2 = .31$; $F(14, 528) = 18.36$, $p < .001$

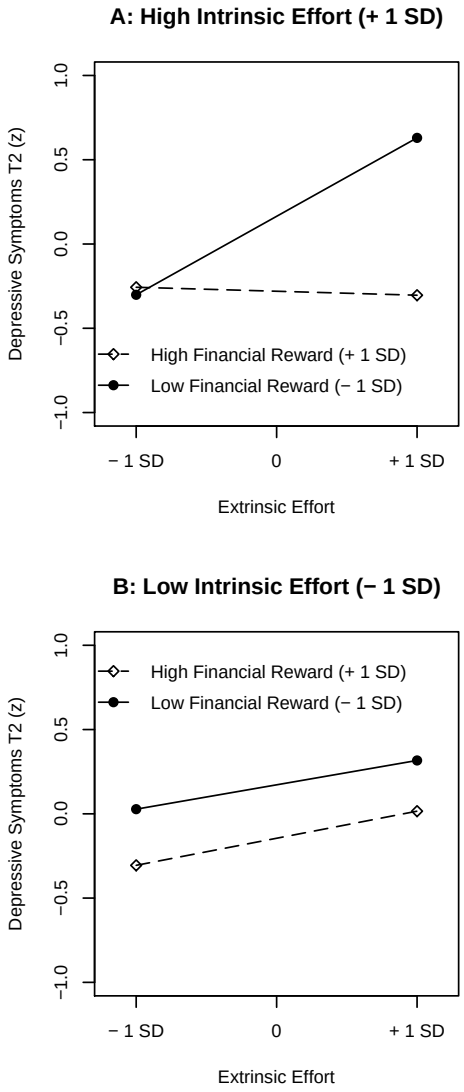


*Figure 4.6.* Three-way interaction: Intrinsic effort as the moderator of the relationship between financial ERI and depressive symptoms at post-deployment.

## 4.4. Discussion

The last of the three consecutive studies on job stress models shifted the main focus from the individual to the organizational perspective. Aiming at developing comprehensive job stress models, in Study 3 Siegrist's (1996a, 1996b, 1999) *Effort-Reward-Imbalance Model* was used to analyze the interaction between job costs and gains on Reservists' psychological well-being (i.e., depressive symptoms).

### 4.4.1. Study Findings

#### Main Effects

The findings of the present study revealed that required effort and received organizational reward had a direct impact on individuals' well-being. Thus, the study was able to identify critical predictor variables of the ERI Model.

In general, if Reservists were required to provide effort due to organizational reasons, they also reported more depressive symptoms. Individuals receiving little financial reward reported more depressive symptoms and also more psychological health symptoms. In each of the analyses, financial reward had the strongest influence on a Reservist's well-being at post-deployment. This finding is not too surprising, as financial issues have already been reported as important concerns by Reservists and linked to their perception of stress in previous studies (e.g., Lakhani & Fugita, 1993; Wynd & Dziedzicki, 1992). In fact, the most frequently reported factor for Reservists to continue their participation in the Reserve Component has been monetary reasons (i.e., pay and allowances, military retirement system; Defense Manpower Data Center, 2005). The positive impact of financial reward on Reservists' depressive symptoms indicates that potential deployment-related financial strain is a major issue for Reservists.

Similarly, individuals perceiving little social reward or recognition by their supervisors reported more psychological health symptoms. The important role of a supervisor on an individual's stress perception has been confirmed in several studies (e.g., Offermann & Hellmann, 1996; van Dierendonck et al., 2004). The present study revealed that lack of supervisor esteem can function as a source of stress,

whereas the presence of supervisor esteem has the potential to alleviate stress and function as a valued resource in times of high effort.

Additionally, the newly introduced component of intrinsic reward had a positive influence on the health outcomes. Receiving intrinsic reward through experiencing pride and meaningfulness on a mission was associated with reduced depressive symptoms as well as reduced general psychological health symptoms. Past research on the ERI Model has not considered any possible intrinsic rewards that an individual could derive from the job (Kasl, 1996). Siegrist's (1996a, 1999) theoretical framework focused solely on the individual's expectations of several kinds of extrinsic rewards from the society, thereby neglecting the potential for intrinsic rewards to alleviate the imbalance on the job. Thus, extending the ERI Model with an intrinsic reward component might be useful as this extension gives the possibility for a deeper understanding of the processes at work (i.e., what aspects of the job foster an employees' health). Furthermore, it shifts the focus from the illness perspective to the health perspective in pointing towards more health promoting factors. For the same reason, the present study used a respective intrinsic effort component with a positive connotation.

Contrary to the expectations, intrinsic effort had no effects on either health outcome variable. In the present study job engagement was selected as representing the reason for why an employee would engage in continued effort without expecting a reward. Job engagement has a positive meaning and lacks the negative aspects of Siegrist's (1999) understanding of overcommitment as the intrinsic effort component. An individual high in job engagement shows continuous effort on the job because the job has the potential to satisfy psychological self-regulatory needs. Thus, job engagement should be more strongly associated with positive job attitudes rather than affecting an individual's health. In fact, a meta-analysis by Brown (1996) found the strongest associations of job involvement with attitude variables like job satisfaction and organizational commitment. However, there was no association found between job satisfaction and negative side effects like stress, work-family conflict or impaired health. These meta-analytic findings are consistent with the results in the present study regarding the main effect of intrinsic effort.

### Findings on Extrinsic/Intrinsic Effort-Reward Imbalance

Besides the main effects, a perceived imbalance between the effort a job required and the reward for this effort lead to an increase in depressive symptoms in the long run. Thus, when individuals experienced a lack of reciprocity for their personal effort they also reported the most symptoms.

The present study distinguished between four different reward components and kept them separately in the analyses as has been requested in previous studies (e.g., van Vegchel et al., 2005). Instead of aggregating the reward variables into an overall reward measure, the present approach made it possible to test the distinct impact of each single reward on the respective effort. Through this procedure the repertoire for intervention approaches for occupational stress reduction can be expanded.

Financial as well as social reward were seen as relevant compensations for extrinsic effort. A lack of appropriate financial benefits as well as recognition of job performance for the required effort leads to increased depressive symptoms within the individuals. The importance of monetary incentives and supervisor esteem has already been discussed for the main effects of these variables.

While a lack of reciprocity was able to influence depressive symptoms, no influence was exerted on general psychological health symptoms. Past research was already able to predict depression with effort-reward imbalance (Godin & Kittel, 2004; Pikhart et al., 2004; von dem Knesebeck & Siegrist, 2003; Watanabe et al., 2004). Yet, to the author's knowledge only two study regarding the ERI Model have looked at predicting general psychological well-being (Calnan, Wainwright, & Almond, 2000; Stansfeld, Fuhrer, Shipley, & Marmot, 1999). Both studies were able to predict mental distress by effort-reward imbalance. However, Calnan et al. (2000) used a cross-sectional design and the way the different ERI components were operationalized remains unclear. Stansfeld et al. (1999) were the first researchers to analyze the ERI Model concerning psychiatric morbidity. They employed the 30-item version of the GHQ (Goldberg, 1972) in a longitudinal study but their operationalization of the ERI Model differed substantially from the operationalization of the present study. Specifically, they concentrated on worker's effort due to competitiveness and overcommitment and on reward representing blocked career opportunities.

Thus, study results might not be comparable.

Previous studies analyzing the factor structure of the GHQ-12 have found through confirmatory factor analyses that the scale was composed of three different subcomponents (Shevlin & Adamson, 2005). These three components were labeled *anxiety-depression*, *social dysfunctioning* and *loss of confidence*. This might indicate that the measure was too broadly conceptualized for the model and sample tested in the present study. Lacking financial reward for a task might not make individuals lose their self-confidence but might instead keep them worrying about the consequences of the low payment, resulting in depressive symptoms. Similarly, lack of financial reward may not result in social dysfunction (i.e., feeling that they are not playing a useful part in things) because the individuals may feel that they in fact are contributing a great deal of effort.

Another possibility for why the GHQ-12 has not yield significant results in the present study might be the way its response scales are generally worded. As a measure of psychological distress, the items of the GHQ-12 were designed to assess the common underlying elements of psychological disturbances among many possible psychiatric disorders (Whaley, Morrison, Payne, Fritschi, & Wall, 2005). The GHQ-12 asks individuals to report the frequency of experienced psychological health symptoms in the last few weeks with the response options *not at all, no more than usual, a little more than usual, a lot more than usual*. Thus, for the negatively worded GHQ-12 items, a person who chronically experiences symptoms of psychological distress would receive a relatively low score on the measure as that individual would report to not experiencing more psychological health problems than usual. Yet, this person could be as ill as a person reporting to experience more psychological distress symptoms than usual. A study conducted by Whaley and colleagues (Whaley et al., 2005) criticizes this type of response assessment, which systematically underestimates the prevalence of morbidity due to ignoring chronically distressed individuals. Therefore, the authors tested for the first time a different scoring method of the GHQ-12 with occupational samples for which it is generally assumed that they will contain a moderate-sized group of chronic sufferers. Results revealed the chronic GHQ-12 to be more appropriate as a measure of screening for psychological morbidity (Whaley et al., 2005). Regarding findings from the present study, it

might be that Reservists who were chronically suffering from psychological distress throughout the one-year deployment would also rather score low on the GHQ-12 scale. This fact could have biased the results concerning the potential influence of the organizational environment in predicting Reservist's long-term psychological distress. Future research should replicate the results of the present study by applying the alternative chronic scoring method of the GHQ-12 before focusing only on more specific psychological disturbances.

In contrast to the extrinsic financial and social reward, the experience of procedural justice reward did not have any impact on Reservists' post-deployment health. There can be several reasons for this lack of effect. It might be that the perception of procedural justice was not an adequate reward for the type of effort that was required within the present sample. Depending on a Reservist's priorities, procedural justice might not have been perceived as relevant. Fair organizational policies and procedures may be particularly relevant for individuals who, for example, seek a promotional reward for their effort. If climbing the military career ladder was not the primary aim of Reservists, then procedural justice would not necessarily be expected to affect their psychological well-being.

Alternatively, it may be that procedural justice is not a proxy for Siegrist's reward component of status control. Possibly, the items used to assess procedural justice were not specific enough. When asking Reservists about the policies and procedures surrounding the initial activation it may have been unclear to the individuals what specific policies were meant for them to consider. Maybe another subcomponent of organizational justice (i.e., distributive justice) would have been more closely related to the reward paradigm (Tsutsumi & Kawakami, 2004). In general, it is important to mention that even though the original ERI-questionnaire has not been used in the present study, the use of proxies for different ERI model components is regarded as acceptable (van Vegchel et al., 2005).

Finally, also the interaction of intrinsic effort and intrinsic reward was not significant. It may be that in the present study, there was no real imbalance between these two constructs, as also their correlation suggested a positive relationship between the two variables. That is, higher intrinsic effort (i.e., job engagement) was associated with higher intrinsic reward (i.e., pride), whereas for example higher extrinsic effort

(i.e., organizational impediments) was associated with lower extrinsic reward (i.e., financial reward).

#### Findings on the Interaction

Even though intrinsic effort had neither a main effect on the outcome variables nor an interaction effect with intrinsic reward, in moderating the influence of the Effort and Financial Reward Imbalance, intrinsic effort became effective. Reservists who reported to have high intrinsic effort but perceived a lack of reciprocity between the organizational demands and monetary benefits reported the most depressive symptoms. This finding is consistent with the interaction hypothesis of the ERI Model although only very little research has already been conducted on that particular hypothesis (van Vegchel et al., 2005).

Individuals who are highly engaged in their job suffer most (i.e., report the most depressive symptoms) when they perceive to be not financially rewarded for their high degree of required effort. As defined in the introduction of the present study, people who have high intrinsic effort have a large part of their self-image identified in their work. High extrinsic effort also means a potential threat to their self-image as job demands include the possibility for bad performance. An additional perceived low financial reward might already be interpreted as an organizational sign of unsatisfaction with the individual's performance. Due to this threat to the individual's self-concept, people who are most involved in their job report the most depressive symptoms.

### 4.4.2. Limitations

Besides the possible limitations due to the operationalization of the different ERI Model components through proxy measures (i.e., job engagement as intrinsic effort; procedural justice as status control) some further limitations should be noted. As in the former studies the interpretation of the analyses might be restricted due to several reasons. Again, results may be biased due to the present sample characteristics consisting of a self-selected group. Thus, the generalizability of the results can be questioned and the findings may not apply to other employment relationships.

However, most of the findings regarding the common ERI hypotheses are in conformance with previous research (cf., Tsutsumi & Kawakami, 2004; van Vegchel et al., 2005). Additionally, results may be biased due to the self-report nature of the data. However, Soldier self-report has been found to be reliable in other contexts (Adler et al., 2005). Finally, also for Study 3 the same conditions apply regarding the effect sizes of the interaction terms as in the previous study (see discussion in Study 2).

### 4.4.3. Implications and Future Directions

Future research should replicate the results of the present study for different deployment settings including combat. Reservists of the present study were sent to Europe to augment security on military installations. They were not sent to a war zone. It would be interesting to consider, how the lack of reciprocity may change within the different model components (i.e., extrinsic vs. intrinsic), when Reservists encounter traumatic war-related stressors. Would money then still be seen as a relevant reward for risking their lives? Maybe the intrinsic aspects of the model would then gain greater relevance.

Besides clarifying the relative importance of the single model components under several conditions, the different model components should also be operationalized with different constructs as the ERI Model leaves room for a broader interpretation of the model components (Kasl, 1996). Specifically, research should focus on other relevant individual characteristics that lead to increased intrinsic effort (e.g., ambition or motivation). May be not all of these individual differences necessarily have a negative effect on individual's health outcomes. That way, research could provide alternative explanations why some individuals remain in their jobs although they do not receive extrinsic rewards.

Further work is also needed to look at other measures of psychological health besides depression and their impact on the organization. A lack of reciprocity might cause an individual to experience other negative emotions like anger or frustration (Siegrist, 1996b), which may increase the intention to leave the organization or even to engage in retaliatory behavior. Behavior-based indices of unhealthy adaptation such as anger and alcohol use are particularly relevant to an organization like the

military (Alexander & Mangelsdorff, 1994; Wynd & Ryan-Wenger, 2004). Including these new concepts as outcome measures into the ERI Model might also increase organizations willingness to engage in adequate intervention programs.

In addition to disruptive employee behaviors, results of the ERI Model have other implications for organizations. The findings of the present study indicate that when employees perceive the effort they put into their work as stressful (i.e., when it is not balanced by a reward), then it affects their well-being. Given that job demands are an innate part of every employment it might not be practical for organizations to eliminate what causes stressful conditions to the employees. Yet, a potential point of intervention for organizations could be to ensure an appropriate reward for the effort required. Through the differentiated analytic perspective on the reward components and by extending the model with an intrinsic reward component the present study directs towards a large repertoire of organizational intervention approaches.

Regarding extrinsic effort, organizations should pay attention to distribute the workload as evenly as possible among their employees. Therefore, managers should receive special training so that they are aware of the problematic situation and plan the work schedules, accordingly. Furthermore, organizations should intend to provide sufficient breaks as well as holidays for recovery. Recovery has been reported as an important factor for maintaining employees' well-being through off-job activities, psychological detachment whereas additionally spending time with work-related activities off the job decreased well-being (e.g., Fritz & Sonnentag, 2005; Sonnentag & Bayer, 2005; Sonnentag & Natter, 2004).

Regarding intrinsic effort, interventions could be designed on the individual or employee group level like a general stress management training to strengthen the individuals cognitive resources and attitudes towards the job. Making people aware of their coping styles and cognitive processes that make them exceed their natural stress resistance can enable them to intervene the next time they experience an imbalance in their working conditions. Conflict management strategies may also be a useful component of stress prevention trainings that gives employees a tool for articulating their problems.

Regarding rewards, it seems like one of the most accepted rewards is monetary compensation. This compensation can have the form not only of monthly pay, but

also of retirement benefits or performance-based bonuses. Another form of compensation at the organizational level that indirectly relates to financial reward might be the policy of a management by objectives, where employees know that they will be rewarded according to their agreement with the employer or supervisor on specified objectives. Similarly, organizations should tailor personal career opportunities according to the individual's achievement.

To account for the importance of social reward, on the managerial level, leaders and supervisors should be trained about how to provide positive feedback to their subordinates. The organization needs to ensure that the employees know how much the organization values the effort each individual provides. For example, a study conducted by Greenberg (2006), found that training immediate supervisors in interpersonal justice resulted in better sleep patterns for employees under high job stress.

In fact, having workers understand how important and meaningful their job is through social recognition may also lead to the feeling of intrinsic reward and thus reduce possible health problems. Another way of valuing the employee and enhance fairness perceptions might be the participation of employees in organizational change. That way, an organization acknowledges the expertise of each individual regarding his/her job conditions and fosters the social network within the organization through for example, discussion groups. Within these discussion groups employees can help identify job related problems and also develop some suggestions for improvement. For example, in Germany, one approach of improving physical and psychological working conditions based on the theoretical framework of the ERI Model was the introduction of so called *health circles* (Aust & Ducki, 2004). In general, employers should care for a better information system within the organization to enhance workplace communication and a sense of fairness among the employees with the help of clear procedures (Tsutsumi & Kawakami, 2004).

Organizations like the military have a particular advantage in considering the rewards that could be offered to employees who expend a great deal of intrinsic and extrinsic effort in their jobs. By offering job stability, family-based support, and future career opportunities (such as money for college), organizations like the military can provide a series of rewards that may enhance employee mental health

when a great deal of effort is required. For organizations that do not have this kind of flexibility in providing a system of rewards, other non-extrinsic rewards will need to be explored.

# 5. Conclusion

The present dissertation aimed at developing different job stress models which included aspects of the organizational environment, the non-work environment as well as individual characteristics, demonstrated on the unique situation of a specific employee sample. In following the goal of building comprehensive job stress models the studies relied on already existing stress frameworks to derive the hypotheses (i.e., McEwen's *Allostatic Load Model* and Siegrist's *Effort-Reward Imbalance Model*).

The findings of the present studies indicated that when analyzing the impact of job stressors on individuals' well-being, researchers should not only account for the actual stressors an individual encounters on the job but also for potential chronic stressors individuals carry with them as a consequence of their unique job situation. The influence of chronic as well as acute stressors on a person's psychological health may not only apply to Reservists but also to employees of other organizations that require their employees to be flexible in terms of, for example, employees' actual job location. Chronic and acute stressors have a potentiating effect on a person's psychological well-being. Thus, an individual facing both chronic and acute stressors experiences an increased amount of strain, which can ultimately lead to symptoms of depression and reduced general psychological well-being. As reduced well-being has been found to diminish an employee's performance, organizations should be inclined to keep the level of conflict that the execution of a job has on the employee's non-work life as low as possible.

Yet, an individual is not generally defenseless when confronted with stressful situations. In general, individuals can rely on a large base of personal resources that function as buffers and have the potential to ameliorate the stressor-strain relationship. However, another important indication from the present analyses is the finding that some individual difference variables (i.e., self-efficacy, coping), which have gen-

erally been regarded as helpful resources when confronting stress, may in fact lead to increased stress consequences. Thus, no general statement can be made about the efficiency of potential resiliency factors unless the nature of a stressor is not taken into account. That is, other resources should be activated when a situation is uncontrollable and unavoidable than when there is a possibility to change the situation. In a situation where an individual can exert no influence palliative coping strategies and less personal engagement can lead to reduced strain and relaxation. In a potentially controllable situation, personal involvement and active approaches lead in fact to a reduction or elimination of the stressor and ultimately to reduced strain. Therefore, the knowledge of how to analyze and understand a problematic situation in terms of its manageability and ability to change it, seems to be critical. Stressors always require adaptive responses and not just standardized reactions. The ability of an individual to be aware of that fact might help to avoid frustration and negative health outcomes.

Organizations could take advantage in planning their employee intervention programs according to the new findings in stress research. Stress-management programs should be designed to teach participants how to perform a flexible and dynamic approach to stressful events. The more alternatives individuals learn, the more likely will they be to train and apply different stress-reduction strategies in their daily lives. The broadening of an individual's cognitive, emotional and behavioral responses will reduce the possibility that someone falls back into his former generalized way of approaching a problem.

Training individuals to become better stress-managers may be only one way of how an organization can care for the well-being of its employees. The findings from the present study suggest an additional intervention possibility, which can be directly initiated by the organization. Regarding the health of an employee in a company, it is important that the relationship between employer and employee is based on reciprocity. That is, there needs to be a give and take between a company and its employees. Asking for sacrifices means for the party who is requesting them that this party also needs to find an appropriate way of compensating for the demanded efforts. Primarily, the most valued organizational reward for employee effort seems to be monetary compensation but also supervisor esteem. Thus, an organization might

consider beyond a base salary to also provide additional monetary incentives for extra effort (i.e., through bonus agreements). Alternatively, due to their affiliation to the organization other employee benefits might be child care programs or additional health care benefits. These alternative benefits may be equally effective as actual pay because they provide indirect monetary investments of the company for the employees. Similarly, a special leadership training for supervisors enhancing their ability for valuable feedback might help to ensure that employees perceive a fair organizational treatment as part of an effort compensation.

However, besides external rewards also intrinsic rewards have been found to influence an individual's health. Thus, emphasizing the meaning of an individual's job task and recognizing the importance of the job contribution might also strengthen an employee's well-being because employees may feel pride, worth and meaning of what they are doing. In order to ensure that employees perceive the relevance of their job, organizations should rely on the help of their managers. A point of departure might be supervisory trainings of how to give employees a performance feedback or how to enhance the employees' perception of interpersonal justice and fair treatment.

Ultimately, if individuals perceive their efforts as being rewarded they may not only feel healthier but they may also be more inclined to put future effort into the job because they feel recognized for what they are doing. Reduced health comes often along with higher rates of absenteeism, sick leave, accidents and as well as with reduced performance. All these outcomes imply negative consequences for organizations and therefore should be tried to avoid.

To conclude, the present studies have shown how critical it can be to specifically apply stress frameworks to the unique situation of the sample in question. Specifically, when analyzing job stress it is necessary to consider both chronic and acute job stressors. Furthermore, the studies also indicated that there are several working points from where to intervene when trying to reduce the generally negative impact of stressors on health. From the individual perspective, several personal resources exist an individual can rely on when facing a stressor. However, the stress response should be adapted to the amount of control an individual has over a stressor. From the organizational perspective, an adequate reward system (i.e., monetary incentives) helps to maintain employee's well-being as only then employees perceive a balance

between their efforts for the organization and the organizational compensation they get in return.

The findings of the present study apply specifically to organizational settings where employees are confronted with both chronic and acute job-induced stressors. These days, the increased competition at the job market due to globalization and weak local economy forces more and more individuals to accept jobs throughout the country or even all around the globe. The organizations require greater mobility and flexibility while not paying enough attention to the double amount of burden they put on their employees in terms of both acute and chronic job-induced stressors. Thus, future studies should devote more effort to broadening the research approach in occupational stress research towards developing more comprehensive job stress models built on a thorough theoretical basis. In bringing forward the issue of double-demanding jobs in occupational stress research, the present studies took the initiative to help bring on findings that may carry over and get effectively applied to the actual employee work setting.

# 6. Summary

Past research on occupational stress has established a clear link between job-related stressors and workers' well-being (Hart & Cooper, 2001). The majority of these occupational stress studies analyzed day to day job situations and focused on the stressors from workers' actual work environment and how they influenced individuals' health. However, when researching an individual's health there are additional influence factors besides the actual job stressors known from other research areas that could also be considered within job stress research. For example, little attention has been paid to stressors that are caused by a peculiar job situation but are not actually present while performing the job. These chronic stressors may have their origin in issues of family separation caused by extended business trips or weekend commutes. Additionally, when looking at individual resiliency constructs few studies have considered their effectiveness according to whether the experienced stressors are controllable or not influencable by the individual. Moreover, besides looking at potential stressors from the organizational environment, it might be useful to also consider organizational resources that buffer these stressors. One exemplary job setting where the issues can be considered simultaneously and become relevant is the Reserve Components.

Reserve Components play a crucial role for military forces. In times of war the Reserve considerably augments the military manpower of a country. While leading a civilian life with their families, during national emergencies, Reservists can be called to active duty. Thus, reserve Soldiers face unique stressors. They need to be in a constant state of readiness. Despite this unique occupational stress situation, only few studies exist that have analyzed the nature of stress in military reserve units, taking into account the particular occupational challenges faced by the "citizen Soldiers" (i.e., Holmes et al., 1998; Perconte et al., 1993; Stuart & Bliese, 1998).

The purpose of the present dissertation was to develop models of job stress. In developing these models, the starting point were two established stress frameworks from different fields of psychology (i.e., *Allostatic Load Model*, McEwen 1998; *Effort-Reward Imbalance Model*, Siegrist 1996a, 1996b). First, using McEwen's Model of *Allostatic Load* (McEwen, 1998), a model from biological psychology, two model components were tested with two consecutive studies.

Specifically, in Study 1 it was hypothesized that acute deployment stressors (e.g., military job impediments, group conflict) have a negative impact on Soldiers' psychological health after their deployment. Additionally, chronic stressors from pre-deployment (i.e., family issues and civilian job issues) influence the amount of pre-deployment stress burden, which in turn also negatively influences post-deployment health. Furthermore, Soldiers reporting both high stress burden at pre-deployment as well as high stressors during deployment were expected to have the worst psychological health problems. McEwen's model was well suited to the work setting of Reservists because it distinguished between the different kinds of potential stressors and accounted for long-term health effects.

Moreover, the *Allostatic Load Model* suggested that individual differences have an influence on the stressor-health relationship. Individual difference variables particularly relevant for Reservists are self-efficacy and coping styles that may function as personal resources when facing stressors. Study 2 analyzed the influence of these two individual difference variables on the perception of pre-deployment and deployment stressors and the combined impact on psychological health.

A second established stress framework was Siegrist's (1996a, 1996b) occupational health model of *Effort-Reward Imbalance* (ERI). The ERI Model has its origins in medical sociology. Still, it is well-suited to the occupational situation faced by Reservists because it examines the psychological contract between employees and the employer, or the balance between expended effort and actual reward. In a third and final study it was hypothesized that Reservists experiencing high effort in combination with low reward report increased depressive symptoms as well as general psychological health symptoms. Furthermore, also high intrinsic effort was expected to be associated with increased health problems and to exacerbate an ERI.

The complete sample of the present study consisted of 654 U.S. Reserve Compo-

nent Soldiers (98.6% National Guard, 0.3% Army Reserve, and 1.1% Active Guard Reserve). The Soldiers were about to deploy to Europe and assist with security augmentation at U.S. Military installations. The majority of the sample was male (93.6%) with a mean age of 31 years (SD = 9.19). Most participants were Caucasian (86.9% vs. 8% African American, 3.4% Hispanic, and 0.5% Asian or Pacific Islander) with the majority being enlisted Soldiers (96.6%, vs. 3.2% Commissioned Officers, and 0.2% Warrant Officers). Concerning their deployment experiences, 82.3% had not been previously deployed, whereas 17.7% had already participated in a deployment. On average Reservists had already spent 9.98 years in the military (SD = 6.93).

Data collection occurred at two different time points between a 12 month timeframe. Surveys were first handed out in January 2002, one month after the activation, when Soldiers were still in the U.S. preparing to deploy. The second data collection occurred in January 2003 after units redeployed to the States. All measures of potential stressors were assessed through self-report data.

Using structural equation modeling the hypotheses from Study 1 were confirmed. Pre-deployment stress burden mediated the relationship between chronic pre-deployment stressors and post-deployment psychological health problems. Additionally, pre-deployment stress burden, as an indicator of chronic stressors, potentiated the relationship between deployment stressors and post-deployment psychological health problems. Using hierarchical moderator regressions Study 2 confirmed that individual difference variables (i.e., self-efficacy, coping) had an influence on the relationship between stressors and health. Specifically, usually known as a resiliency construct, high self-efficacy was associated with increased health complaints when experiencing high stress, whereas high passive coping was related to reduced health symptoms when individuals suffered from pre-deployment stress burden. In Study 3 an imbalance between extrinsic effort and financial as well as social reward led to increased depressive symptoms. Additionally, intrinsic effort moderated the imbalance between extrinsic effort and financial reward on depressive symptoms. These findings partially supported the third set of hypotheses.

The findings from the present studies point toward the complexity of the stress process, specifically within the work setting. Individuals may need to deal with more

stressors than would be obvious at first sight. Thus, in future studies researchers should carefully consider the different nature of stressors individuals encounter. The complexity of the stress process has also implications for individuals. It is not enough to rely on personal resources but to adapt their use according to the nature of the situation that is encountered. From the organizational perspective the results imply that employers should find an adequate way to compensate their workers for their increased effort in order to avoid negative health outcomes. Otherwise, decreased health will also lead to diminished performance, which ultimately has negative consequences for the organization.

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