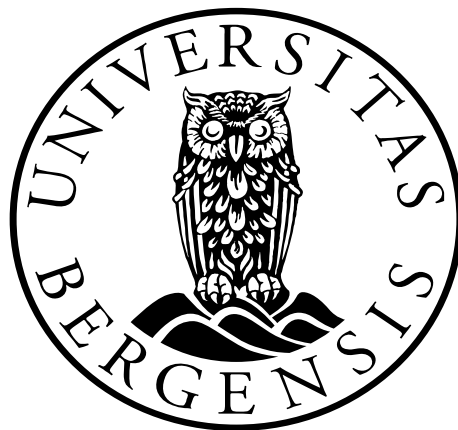


Managing stress in security operations

A prospective study on the indirect influence of psychological hardiness on mental distress through self-efficacy and worry

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Abstract

Kobasa's (1979) concept of psychological hardiness has previously been identified as an important resilience factor for development of mental health issues in response to environmental stressors in military contexts. Still, present hardiness research has yet to provide a precise understanding of how hardiness exerts its effect on mental health outcome. The present study represents an attempt to clarify the proposed association between psychological hardiness and mental health outcome by proposing self-efficacy and worry as mediator variables. A prospective cohort study followed 166 crewmembers deployed on naval vessels as part of NATO's counter piracy mission Operation Ocean Shield in the Gulf of Aden and off the Horn of Africa, and obtained individual reports prior, during, and after the mission. The theoretical framework provided basis for a non-reciprocal path model that included hardiness as the independent variable, self-efficacy and worry as mediator variables, and mental distress (GHQ-12 and HSCL-25) as the dependent variable. It was hypothesised that hardiness would decrease reports of mental distress through hardiness' influence on self-efficacy, and increase reports of mental distress due to hardiness' effect on worry. Ultimately, the present study was unable to find an association between hardiness and mental distress, as well as to provide support for the proposed mediation model. The contradictory nature of the present findings gives reason to provide a thorough account of the key strengths and limitations of the present research design and sample, as well as attending to central criticisms from the past and directions for future hardiness research.

Keywords: Psychological hardiness, peacekeeping missions, self-efficacy, worry, mental distress, prospective cohort study, mediation analysis

Sammendrag

Psykologisk robusthet (Psychological hardiness; Kobasa, 1979) har tidligere blitt identifisert som en viktig resiliensfaktor som beskytter individer fra å utvikle symptomer på mentale plager i møte med stressende situasjoner i militære omstendigheter. Samtidig har den nåværende forskningen på området vært ute av stand til å presist kunne forklare hvorfor og hvordan robusthet påvirker mental helse. Denne studien representerer et forsøk på å klargjøre forholdet mellom robusthet og mental helse ved å introdusere ferdigheter (self-efficacy) og bekymringer som medierende faktorer. En prospektiv studie fulgte 166 deltakere utplassert på NATO sitt fredsbevarende oppdrag for å hindre piratvirksomhet i Adenbukta og på Afrikas horn, Operation Ocean Shield, hvor individuelle tilbakemeldinger ble samlet inn før, under, og etter utplassering. Det teoretiske rammeverket la grunnlag for en enveismodell som inkluderte robusthet som uavhengig variabel, ferdigheter og bekymringer som medierende variabler, og symptomer på mental helseplager (GHQ-12 og HSCL-25) som avhengig variabel. Det ble foreslått at et negativt forhold mellom robusthet og rapportering av mentale helseplager ville oppstå som følge av robusthet sin påvirkning på ferdigheter, og et tilsvarende negativt forhold mellom robusthet og rapportering av mentale helseplager som følge av robusthet sin innflytelse på bekymringer. Til syvende og sist var ikke analysene i stand til å avdekke en assosiasjon mellom robusthet og mentale helseplager, og fant heller ikke støtte for den foreslåtte medieringsmodellen. Resultatene gir grunnlag for en nøye drøfting av studiens styrker og begrensninger, men retter samtidig oppmerksomhet mot tidligere uttalt kritikk mot forskning på psykologisk robusthet, samt drøfter fremtidig forskning på området.

Nøkkelord: Psykologisk robusthet, fredsbevarende oppdrag, ferdigheter, bekymringer, mental helse, prospektiv studie, medieringsanalyse

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Introduction

Individuals that participate in peacekeeping operations are particularly subjected to high degrees of uncertainty, threat, loneliness, boredom, and procedural demands that are commonly associated with deployment on international missions. The salient presence of environmental stressors has deemed the military setting an attractive field for investigating potential influences of stress on mental health outcomes, including effects of individual personality functioning. To better understand individual reactions to stressful circumstances, Kobasa (1979) developed the concept of psychological hardiness. The conceptualisation of hardiness as a pathway to resiliency rendered considerable amounts of research in the following years, whereby a substantial amount of studies found that hardy individuals show fewer signs of mental distress despite being exposed to environmental stressors. At the same time, related studies had observed that high levels of self-efficacy appeared to have similar positive effects on health outcome (Bandura, 1977), with later studies indicating that the ill-effects associated with military stress could be the result of increased worrying about family concerns while deployed on international missions (Johnsen, Eid, Birkhaug, Sommerfelt-Pettersen, & Koefoed, 2007). Despite insistent attempts the hardiness literature has yet to establish the precise mechanisms through which hardiness exert its effect on mental health (Hystad, 2011). Consequently, the present study represents an attempt to clarify the relationship between hardiness and mental health, and does so by introducing the concepts of self-efficacy and worry as mediator variables.

Psychological hardiness as a pathway to resilience

Decades of research have established an association between stress and varieties of mental and somatic illnesses (Dohrenwend & Dohrenwend, 1981; Bartone, Ursano, Wright, & Ingraham, 1989; Bartone, Johnsen, Eid, Brun, & Laberg, 2002; Sapolsky, 2004). However, initial research on this association found that these correlations were moderate at best (Rabkin & Struening, 1976), thus suggesting that stress merely accounted for part of the variance in subject illness. Accordingly, the literature progressed to identify factors that could have direct, indirect or modifying effects on health and illness (Soderstrom, Dolbier, Leiferman, & Steinhardt, 2000). Within this context, psychological hardiness has been identified as individual-level resource that precedes and assists in maintaining good health outcomes (Hystad, 2011). Prior to introducing the theoretical framework of hardiness functioning, it is necessary to recognise that the hardiness literature has attended to both physical and psychological health when looking for effects of hardiness on health outcomes. Research on the association between hardiness and somatic illnesses provides relevant

support for the present study because mental disorders such as Posttraumatic Stress Disorder (PTSD), anxiety, and depression are frequently associated with somatic illnesses (Norris, Maguen, Litz, Adler, & Britt, 2005). Nevertheless, the main interest for the present study lies in a consideration of hardiness' influence on mental health and symptoms of mental distress.

In 1979, Suzanne Kobasa first described a personality style that later would become known as psychological hardiness (Kobasa, 1979). Kobasa proposed that individuals who maintain good health despite experiencing high levels of stress have a personality structure that differentiates them from individuals that fall ill under similar circumstances. Originally, hardiness was conceived as a personality structure that was comprised of three related dispositions: control, commitment, and challenge. Control was believed to influence how people view their abilities to control the environment through action, whereas commitment related to individuals' ability to genuinely feel involved and committed to activities and events that make up individuals' life, work, and self. In turn, challenge was considered to involve seeing change and stressful situations as normal aspects of the human experience, in addition to perceiving them as interesting and worthwhile. Maddi & Kobasa (1984) conceptualise hardiness as a personality variable that develops early in life and is reasonably stable over time, though flexible to certain conditional changes (Maddi & Kobasa, 1984). Recently, Maddi (2004, 2006) has defined hardiness as three related attitudes comprised of the individual's control, commitment, and challenge that provide an ability to transform stressful situations into opportunities for growth rather than as aversive events. Still, according to Ouelette (1993) the three general characteristics were never supposed to fully describe hardiness theoretically. Rather, these three dimensions offer a useful operationalization of hardiness functioning (Bartone, 2000). Aligned with Ouelette's (1993) conceptualisation of hardiness, Bartone (2006) proposes that hardiness is a generalised style of functioning that influences how individuals view themselves and how they relate to their surrounding environments. If hardiness is best conceptualised as a personalised style of functioning, it is likely a result of both cognitive and behavioural processes, in addition to underlying physiological processes (Hystad, 2011). Previous research (Maddi, 2006) has observed that environmental stressors pose physical and mental strain on the individual that can lead to breakdowns in health and performance. The generalised personality style of hardiness is thought to moderate the effects on this process by reassuring effective cognitive and behavioural coping (Williams, Wiebe & Smith, 1992), providing individuals with abilities to utilise social support (Kobasa & Puccetti, 1983), and decrease physical responses

to stress (Kobasa, Maddi, Puccetti, and Zola, 1985). The following introduction will proceed to provide a more thorough presentation of applicable literature for explaining the mechanisms through which hardiness exerts its effect on health. Prior to this attention will be given to research that has provided evidence for a relationship between hardiness and mental health, as well as considering common criticisms of the hardiness concept and its applicability for military and security roles.

Hull and associates (1986), Funk (1992), and Eschleman and colleagues (2010) have summarised findings on the influence of hardiness on various outcomes and contended that, although suffering from certain limitations, the hardiness concept appears to be a valuable predictor of beneficial outcomes. The meta-analyses have incorporated a number of empirical studies that have identified a positive relationship between hardiness and physical and mental health in addition to recognising hardiness as a buffer of negative health outcomes commonly associated with stress (Kobasa, 1979; Kobasa, Maddi, & Courington, 1981; Kobasa, Maddi, & Kahn, 1982; Kobasa, Maddi, & Puccetti, 1982; Kobasa & Puccetti, 1983; Kobasa, Maddi, & Zola, 1983; Britt, Adler, & Bartone, 1998; Bartone, 1999; Bartone, Johnsen, Eid, Brun, & Laberg, 2002). Research on the association between hardiness and health began with Kobasa's (1979) study of stressful life events, hardiness and health in middle and upper level executives. Aligned with the original conception of hardiness, the study proposed that hardy individuals would remain healthier than lower hardy individuals by exerting a greater sense of control over life events through increased decisional control, cognitive control and coping skill. Additionally, hardy personality functioning would be detected from the individuals' commitment to various aspects of life, and influence how the individuals appraise change and unexpected events. The research findings supported the proposed hypotheses by showing that individuals that obtained a high score on control, commitment, and challenge, remained healthier despite the presence of environmental stressors than low hardy individuals (Kobasa, 1979).

In a later study, Allred & Smith (1989) assessed the cognitive and physiological responses to a challenging task under high and low evaluative threat based on participants' hardiness score. The study found that hardy individuals reported more positive statements about themselves than did less hardy individuals. Later findings suggest that there is a negative relationship between hardiness and high levels of worry and anxiety (Hanton, Evans, & Neil, 2003), as well as hardiness being a predictor of successful adaptation in mothers of children with developmental disabilities (Weiss, 2002). Beasley and colleagues (2003) found that hardiness appear to have a direct effect on psychological and

physiological distress (Beasley, Thompson, & Davidson, 2003). However, when looking at hardiness as having a buffering effect on negative life events by reducing the influence on mental health outcome, significant findings was only evident in females. The latter finding demonstrates that there are still inconsistencies in the hardiness literature.

For instance, the research has been criticised for inappropriate measures of hardiness and its frequent use of specific samples that does not allow for general conclusions to be made. The initial studies (e.g. Kobasa, 1979; Kobasa et al., 1982) were criticised for an almost exclusive use of white, working, middle-class men to ascertain a relationship between hardiness and health. For later research in military psychology, the common majority of male participants in military organisational settings have made it equally difficult to generalise these findings to other groups in general, and to female samples in particular (Hystad, 2011). A separate criticism of the hardiness construct has been its apparent relationship with neuroticism. The overlap between hardiness and neuroticism was suggested as a result of negatively formulated items in the original hardiness scales but revised scales have been developed to include more balanced numbers of negatively and positively worded items (Hystad, 2011). In turn, some studies have found that controlling for neuroticism eliminates the effect of hardiness (Allred & Smith, 1989; Williams et al., 1992), whereas others have found positive associations between hardiness and health when the effect of neuroticism was partialled out (Kravetz, Drory, & Florian, 1993; Sinclair & Tetrick, 2000). A criticism that is still relevant for current hardiness research is whether it should be considered a unitary phenomenon or as independent influences of control, challenge, and commitment (Hull, Van Treuren, & Virnelli, 1987; Funk, 1992). As there have been recent suggestions made about how to measure hardiness, a thorough account of the dimensionality issue will be given subsequent attention throughout the text. Importantly, the advancements imply that the original criticisms regarding dimensionality is still of concern for current hardiness research.

Despite its limitations, hardiness has been a widely used measure of resiliency in military organisational settings. Thus, in the remainder of the introduction some of the main findings on the association between hardiness and health outcome in military and security roles will be presented. Subsequent attention will be given to clarifying the proposed underlying mechanisms of hardiness, before proceeding to a consideration of self-efficacy and worry as potential mediators in the hardiness–health relationship. Finally, a proposed mediational model including hardiness, self-efficacy, worry, and mental health will be presented.

Hardiness in military and security roles

The concept of hardiness as a pathway to resilience for individuals under high degrees of environmental stress has attracted considerable attention within the field of military psychology. Understanding the nature of stress on peacekeeping missions is important as both individual health among participant and mission success depend on how effectively they adapt to these missions stressors (Bartone, Adler, & Vaitkus (1998). Bartone and colleagues (1998) identified the main stress factors at various phases of a peacekeeping operation, and observed that high stress was linked to poorer health and lower morale. The military setting is an organizational environment that often involves highly stressful situations with increased possibilities for the occurrence of life-threatening events when compared to most civilian organisational settings. This difference makes for an interesting setting for studies on how individuals adapt to stressful circumstances, and why certain individuals appear to be resilient to the negative health consequences commonly associated with stress. The presence of environmental stressors emerges as soon as during initial military training. Maddi (2013) observed a group of training cadets at the U.S. Military Academy in West Point, New York, and found that they are subjected to stressors including sleep deprivation, strenuous field exercises, living to a high standard of character and behaviour, and limited opportunities to visit home. Additional stressors that can emerge as the cadets proceed to full-time jobs in military organisations include dealing with uncertainty, danger, threat, potential death of self or acquaintances, and injuries (Huddleston, Paton, & Stephens, 2006; Bartone & Hystad, 2010). To investigate the potential influence of hardiness when facing such environmental stress, Florian and colleagues (1995) investigated the relationship between hardiness and health in Israeli recruits, and found that commitment and control predicted mental health at end of training (Florian, Taubman and Mikulincer, 1995). Related studies have shown that hardiness acts as a moderator in coping with combat exposure stress (Bartone, 1999, 2000), and that it alleviates the ill effects of stress through beneficial coping strategies (Bartone, Hystad, Jocoy, Laberg, & Johnsen, 2015). Consequently, research suggests that hardy individuals in military organisational settings appear to have better health outcome than lower hardy individuals, including fewer symptoms of PTSD (Escolas, Bartone, Pitts, & Safer, 2013). Nevertheless, Maddi (2013) points out that military stress can emerge from other sources. Working as security personnel does not involve a day-to-day schedule that is constantly involved with threat. Rather, they spend amounts of time away from friends and family simply waiting for potentially threatening events to occur. This could lead to states of stress

characterised by loneliness, detachment and emptiness. The hardiness literature has attempted to explain how hardiness exerts its influence on mental health using a range of different approaches. The predominant explanations gather around a consideration of environmental factors, neurobiological variables, and cognitive influences.

The underlying mechanisms of hardiness

Environmental variables. Several studies have found that hardiness is associated with social resources (Bernas & Major, 2000; Kobasa & Puccetti, 1983; Weiss, 2002; Manning & Fusilier, 1999). Williams and associates (1992) examined support seeking as a mediator in the hardiness-health relationship, and found that hardy individuals appear to have better health outcomes as a result of their increased reports of social support. Still, contrary findings have indicated that hardiness and social support influence health outcome independent from each other (e.g. Pengilly & Dowd, 2000). While there appears to be a relationship between hardiness and social resources, it is less clear how these variables relate to each other (Hystad, 2011). One explanation is that hardy individuals' commitment to multiple aspects of their life, including work, family, friends, and social activities, makes them more susceptible to draw upon these relationships if needed (Kobasa & Puccetti, 1983; Eschleman, Bowling, & Alarcon, 2010). Although social support represents an attempt to clarify the underlying mechanisms of hardiness functioning, hardiness scholars contend that overall effects of hardiness on mental health outcome is likely the result of interplay between multiple variables. Importantly, recent hardiness research has paid increased attention to neurobiological correlates of hardiness functioning.

Neurobiological variables. According to Kobasa and associates (1985), hardiness helps to decrease the physical arousal that usually accompanies stressful situations. This is said to occur as the result of hardiness' influence on appraisal and coping mechanisms, whereby hardy individuals arguably experience decreased arousal as a consequence of their optimistic cognitive and behavioural coping styles. In turn, this reduces the long-term consequences of stress (Wiebe, 1991). One approach for examining the association between hardiness and physiological correlates is to investigate differences in cardiovascular activity in hardy individuals versus low hardy individuals. Some support for this association can be found in the literature, albeit with contrary findings. Interestingly, Allred and Smith (1989) reported that hardy individuals tended to have higher systolic blood pressure (SBP) than less hardy individuals. Related analyses have revealed no association between hardiness and SBP, diastolic blood pressure (DBP), and heart rate (HR) (Hallas, Thornton, Fabri, Fox, & Jackson, 2003). Contrada (1989), on the other hand, found that hardy individuals tended to

have lower SBP and DBS than less hardy individuals. Still, the complexity of individuals' physical responses to stress makes it difficult to assume a consistent relationship between hardiness and physical arousal (Hystad, 2011). More recent findings on the biological correlates of hardiness include an examination of the link between hardiness and several immune and neuroendocrine markers (Sandvik et al., 2013). Sandvik and colleagues (2013) collected blood samples from 21 Norwegian navy cadets prior to and during a highly stressful military exercise. The results revealed that hardiness could be divided into two functioning clusters, either as individuals with a balanced hardiness profile or as individuals with an unbalanced hardiness profile. The latter cluster was comprised of individuals that obtained a high score of hardiness' subcomponents commitment and control, whereas the balanced hardiness profile was comprised of high reported scores on all three dimensions. Moreover, the study showed that having a balanced hardiness profile was related to more moderate and healthy immune and neuroendocrine responses to stress than for subjects in the unbalanced hardiness group. The latter study reflects the last decade's advancements in the use of computerised instruments in examining human behaviours, in addition to questioning the dimensionality of hardiness by proposing new hardiness clusters. Taken together, studies of the neurobiological correlates of hardiness provide interesting visions into the future of hardiness research. Nonetheless, throughout the history of hardiness research the most extensive research on hardiness functioning appears to gather around hardiness' relationship with cognitive abilities and behavioural coping. Therefore, the next section will attend to the proposed association between hardiness, appraisal, and behavioural coping.

Cognitive influences. The current theoretical framework suggests that hardiness can moderate the negative effects of stress through appraisal and behavioural coping (Williams et al., 1992; Hystad, 2011). Appraisal is the cognitive process through which an event is evaluated with respect to what is at stake and what coping resources and options are available (Folkman & Lazarus, 1980). This entails that an individual's cognitive appraisal will determine if an event is perceived as stressful or not. Theory suggests that hardiness alters two appraisal components, namely by reducing the appraisal of threat and increasing the expectation of effective coping (Florian et al., 1995). By proposing that the influence of hardiness on health is mediated in part by cognitive appraisal mechanisms, hardy individuals can be perceived as interpreting stressful situations as less threatening and thereby reducing the negative impacts associated with such events (Kobasa et al., 1981; Kobasa et al., 1982; Allred & Smith, 1989; Rhodewalt & Zone, 1989; Westman, 1990).

Appraisals are usually based on a number of subtle cues in the environment, which has been learned through direct or indirect experience with, for instance, a psychological stressor (Lazarus, 1999). The former can refer to personal experience with the person-environment relationship, whereas the latter can refer to experiences derived from social modelling, in other words, observing how others benefit from certain behaviours. Additionally, appraisals are based on multiple personality variables such as goals, personal resources and situational intentions. Combined, these provide a basis for deciding how to respond in a given situation. Lazarus (1999) distinguishes between primary and secondary appraisal. Primary appraisal is concerned with the personal relevancy of the experience in making inferences about it. If an individual does not perceive that a given situation is relevant for his well being, he is less likely to appraise the situation as being stressful. Secondary appraisal refers to the subsequent reaction to primary appraisals (Lazarus, 1999). An event is secondarily appraised after a primary appraisal of a stressful situation as posing threat, challenge, or harm. The key is the individual differences in the appraisal of stress as either a challenging or threatening, whereby theory suggest that an appraisal of stress as challenging provide individuals with the opportunity to mobilise accurate behavioural coping responses. Consequently, the positive relationship between hardiness and mental health outcomes is argued to be a result of the hardy individual's appraisal of stress as challenging rather than threatening. It equips the individuals with the ability to engage in successful coping strategies. Still, Lazarus (1999) emphasises that appraisal vary across different situational circumstances, and put forward environmental dimensions such as novelty-familiarity, clarity of meaning-ambiguity, and predictability-unpredictability as variables that potentially moderate and influence appraisal. He also suggest that temporal factors such as imminence, duration and timing can affect the appraisal of an event as being threatening or challenging. In other words, this suggests that individuals will be more likely to regard a stressful situation as challenging if the circumstances are characterized by familiarity, clarity and predictability. Also, this implies that imminence, long duration, and bad timing can favour an appraisal of the event as threatening. Importantly, the role of hardiness as a valuable predictor of mental health outcome need to consider contextual factors in assuring a stable effect of hardiness on health during an extended period of time.

Through the appraisal of an event as either challenging or threatening, hardiness is believed to influence the use of behavioural coping strategies. Stress level is argued as an influence on how effectively a person copes with the situation, whereby ineffective coping leads to high levels of stress, and more effective coping result in low levels of stress. Thus,

the low levels of stress observed in hardy individuals is said to be a result of engaging in effective coping strategies. Lazarus (1999) proposes that coping is an extremely complex mechanism that includes varieties of coping actions depending on individual resources, goals, and beliefs about the self and the world. Herein, hardiness should be considered an individual resource that can enhance the use of effective coping strategies.

Several studies have shown that hardiness appear to be positively related to problem-oriented coping strategies and inversely associated with emotion-oriented coping (Gentry & Kobasa, 1984; Williams et al., 1992; Florian et al., 1995; Beasley et al., 2003). Lazarus (1999) defines problem-oriented coping as an ability to gain information about what needs to be done and mobilize the necessary behaviours to successfully cope with the situation. On the other hand, emotion-oriented coping concerns regulation of emotions that occur in response to a stressor. Individuals that engage in emotion oriented strategies are more inclined to avoid the threat by refusing to attend to its presence, or to reappraise the situations without changing the realities of the event. In a series of studies, Folkman, Lazarus and colleagues (1986, 1987) observed that when conditions of stress are appraised as changeable, individuals are more inclined to use problem-focused coping strategies (Folkman, Lazarus, Gruen, & DeLongis, 1986; Lazarus & Folkman, 1987). When the conditions are appraised as unchangeable people are more likely to approach the situation with emotion-focused coping (Lazarus, 1999). One of the core features in the concept of hardiness is that high hardy individuals appear to appraise change as being interesting and worthwhile, thereby providing valuable support to the use of problem-focused coping among high hardy personality profiles. Additionally, hardy individuals have a sense of belief in their abilities to control outcomes by mobilising the necessary behavioural response. Within this, hardy individuals may be more inclined to perceive a greater majority of events as changeable than their lower hardy counterparts.

However, there are still uncertainties regarding the causal pathways through which hardiness exert its effect on mental health outcomes. A common feature of the studies that report an association between the variables in question, have not exclusively tested for the proposed mediating role of coping. Rather, they have demonstrated correlations between coping and hardiness or simply included both in a regression analysis to predict health (Hystad, 2011). Studies that have included tests for mediation have produced inconclusive findings (e.g. Florian et al., 1995; Rush, Schoel, & Barnard, 1995; Clark, 2002). For instance, Rush and colleagues (1995) found a relationship between hardiness and coping, but were unable to report that coping mediates the association between hardiness and health.

Thus, although there appear to be a relationship between hardiness and coping, research has been less successful in establishing an indirect effect of hardiness and health through coping mechanisms. Based on the above discussion, the present study aims to investigate a potential indirect effect by proposing a new set of variables, namely self-efficacy and worry.

Self-efficacy

According to Bandura (1986, 1997, 2006, 2008, 2012), people have the ability to make causal contributions to their own psychosocial functioning through mechanisms of personal agency. To be an agent means being able to exert intentional influence over the course of life events. Bandura, and social cognitive scholars alike, contend that intentional acts are influenced by sense of trust in that certain behaviours can produce desirable effects. These beliefs that individuals hold about their capability to control the multifaceted events in their lives is referred to as self-efficacy beliefs, and are considered as having widespread influence on human functioning (Bandura, 1997). Decades of empirical research has produced a great number of studies who have successfully established a positive relationship between self-efficacy and a range of motivational and behavioural outcomes in organizational (Wood & Bandura, 1989a, Stajkovic & Luthans, 1998), clinical (e.g. Bandura, Adams, Hardy, & Howells, 1980), and military settings (Solberg, Laberg, Johnsen, & Eid, 2005). The concept of self-efficacy is located at the very core of social cognitive theory as one among other factors used to predict and explain human behaviour. Thus, in order to fully understand and appreciate the functional properties of self-efficacy it is necessary to provide a brief outline of social cognitive theory's main principles.

Social cognitive theory operates with a causal structure grounded in triadic reciprocal causation (Bandura, 1986). The term causation is applied to describe the functional dependence between events. In this view of self and world, human functioning is seen as a product of the interaction between internal personal factors, behaviours, and environmental events. Self-efficacy is a constituent of internal personal factors, and is thus proposed to contribute to how individuals behave in the course of their lives by means of interaction with the environment. The agentic perspective in social cognitive theory separates between three types of environments, imposed, selected, and constructed. Whereas imposed environments can act on the individuals whether they like it or not, selected and constructed environments accept that people still have a potential for selecting and constructing how environmental events will contribute to their functioning. In situations where personal agency can be exercised individually, people can bring their personal resources to control the event directly. However, in other spheres they will have to rely on influencing related agents in

order to exercise control over an event. This could be exemplified as recognizing the personal resources of other agents, and act on behalf of others in order to secure the desired outcome.

Self-efficacy beliefs are developed from four principal sources (Bandura, 1997). First, they develop through mastery experiences. When individuals have a history of experiencing easy success they are more inclined to expect quick results from their future actions. While this can lead to effective execution of necessary behavioural actions, it can also result in discouragement if they fail to achieve the desired outcome by exerting their usual response when dealing with specific situations. The development of resilient self-efficacy requires experience in overcoming setbacks, as well as learning to transform failure from something demoralizing to something informative (Bandura, 2012). Second, beliefs of personal capabilities can be developed through social modelling. While some activities are relatively easy to judge for their personal capabilities, others are more ambiguous in terms of success (Bandura, 1997). In such situations, people must depend on the accomplishments of others. Thus, by observing similar individuals achieving success through perseverant effort, an individual can gain a sense of trust in their capabilities by exercising similar efforts. The third mode of influence is social persuasion. If individuals can be persuaded to believe in their capabilities this will lead to increased chance of success. If struggling with difficulties it is easier to sustain a sense of efficacy if significant others voice a belief in their capabilities (Bandura, 1997). Moreover, persuasion can lead the individual to increase mobilizing, and help him or her focus on success rather than dwell on personal deficiencies. The fourth source of self-efficacy is physiological and affective states. Somatic indicators of personal efficacy are especially relevant in situations that involve coping with stressors. A common response to stress is to interpret physical activation in stressful situation as signs of inadequacy and dysfunction. Thus, some are inclined to expect poor success when experiencing states of aversive arousal (Bandura, 1997).

Importantly, the development of self-efficacy beliefs concerns choice processes. Beliefs about self influence the variety of options people consider and the decisions they make in important situations. Thus, by choosing certain routes of actions, people are able to assure desired outcomes based on their personal self-beliefs (Bandura, 2012). However, effective personal functioning is not simply a result of knowing what to do and acting accordingly, neither is it a fixed ability that some people have and other do not (Bandura, 1997). Rather, self-efficacy is a generative capability in which cognitive, social, emotional, and behavioural skills must be organized and effectively put together to serve innumerable

purposes (Bandura, 1997). To sum up, self-efficacy is not the number of skills one has, but the belief that one can act intentionally with the skills one possesses under different situations.

The perceived benefits of having a high sense of self-efficacy derive from individual functioning as mediated by cognitive, affective, and motivational processes (Bandura, 1997). Cognitive processes can include cognitive constructions of events such as setting personal goals. Because personal goal setting is affected by self-appraisal of capabilities, people with a high sense of efficacy will typically set high goals for themselves and feel increased commitment to them (Wood & Bandura, 1989b; Locke & Latham, 1990). Research has also shown that individuals with a high sense of self-efficacy choose activities that are more challenging than individuals with poor sense of efficacy (Kavanagh, 1987). People that believe in their capabilities view situations as opportunities for growth, whereas people with a lower sense of efficacy construe uncertain situations as threatening and are more likely to visualize failure (Krueger & Dickson, 1994). Such cognitive negativity where the individual dwell on personal deficiencies can weaken motivation and performance. Indeed, multiple studies have shown that visualizing successful actions predict improvement in performance (Feltz & Landers, 1983; Bandura, 1986; Beauchamp, Bray, & Albinson, 2002), while visualizing faulty actions impairs performance (Powell, 1973). Self-efficacy beliefs also exert their influence on human functioning through motivational forces (Bandura, 1997). Self-motivation is grounded in cognitive activity, whereby people motivate themselves through the exercise of forethought. This is translated into potential courses of action through self-regulatory mechanisms, which are influenced by people's efficacy beliefs. This entails that when people set high personal goals, they motivate themselves by anticipating negative and positive outcomes of different actions and organize their behaviour in order to assure desired scenarios. However, people do not only rely on their expectancies of what certain behaviours lead to, but also on their belief about how capable they are in assuring the expected outcome. The more people believe that they can meet challenges the more likely they are to intensify their efforts when they fail and persist until they succeed (Bandura, 1997). Beliefs of self-efficacy are also important in the regulation of affective states. Efficacy beliefs are thought to influence the intensity of emotional experiences by, for instance, affecting how life events are cognitively construed and represented. This in turn decides whether an affective state is represented as benign or disturbing. People who believe that they can exercise control over threats and their corresponding affective arousal, are more inclined to stay calm and not frighten themselves. This, in turn, leads to better performance and increased opportunity for developing strong and resilient beliefs of self-

efficacy (Bandura, 1997). Those who appraise potential threats as unmanageable are less likely to mobilize necessary actions and more likely to engage in negative thinking about their coping deficiencies. This leads to increased distress, and can impair such individuals' functioning (Lazarus, 1999; Bandura, 1997). All this points to an important aspect of self-efficacy influence, namely that perceived control in a stressful situation influences performance. It is proposed that an experience of perceived control transform threatening situations into less threatening ones and thereby help to alleviate aversive states, such as affective responses to anxiety (Rapee & Barlow, 2002).

An intuitive relationship between hardiness and self-efficacy can be inferred based on the above discussion. Hardiness and self-efficacy share a number of characteristics, still, it is important to underline that while hardiness is considered a stable personalized style of functioning, self-efficacy is regarded as a generative capability. The present study wish to examine whether hardiness regulates behaviour in a manner that ensures increased self-efficacy, which in turn can help explain why hardy individuals appear to have better mental health outcome than their less hardy counterparts despite being under environmental stress. It is possible to regard the influence of hardiness on self-efficacy both directly expressed in the sources of self-efficacy and indirectly via the influence of hardiness on cognitive, affective, and motivational processes.

Influence of hardiness on sources of self-efficacy. The hardy person is characterized by an ability to engage in problem-solving with high confidence of success. Moreover, hardy individuals believe that they can influence the outcome in situations they perceive to be in control over. Thus, hardy individuals can be proposed to influence self-efficacy by their ability to find support in their ability to solve problems and to not be bothered by setbacks in events where they had little or no control in determining the outcome. They may benefit from this ability by precisely defining the elements of stressors that are controllable and mobilise the accurate measures needed to assure the desired outcome. The hardy individual is also considered particularly capable in transforming stressful situations into less stressful ones. Consequently, hardy people can enhance self-efficacy growth by being more susceptible to transforming events from something threatening to something interesting and worthwhile. The hardy individual's sense of trust in his ability to control events can also influence how they respond to social modelling. It is possible to suggest that low hardy individuals will experience a reduced ability to achieve the similar outcomes as observed in others, meaning that hardy individuals will enhance their self-efficacy by having more trust in their abilities. This is also applicable to the third

source of self-efficacy, social persuasion. When struggling with difficulties it is easier to sustain a sense of efficacy if others voice a belief in their capabilities. Hardiness has been related to problem-focused coping, which is characterized by gaining the necessary information about what needs to be done and mobilize accordingly. Thus, perhaps hardiness influence self-efficacy by the hardy individual's active attempt to gain information about the situation, herein contacting others and being susceptible to their feedback. Also, based on their confidence in their capabilities, they may very well be more inclined to have trust in positive statements received from such significant others. Finally, self-efficacy is developed from interpretation of physiological and affective states, whereby low self-efficacy stems from appraising physical arousal as synonymous with poor success. Again, as hardy individuals appear to transform stressful situations (including the experience of physical arousal) into less stressful ones, they may enhance self-efficacy by not being affected by physical responses that are commonly associated with stressful events.

Influence of hardiness on self-efficacy through cognitive, affective, and motivational processes. Hardy individuals are characterised by their increased commitment to various aspects in the individual's environmental surrounding. Similarly, individuals with a high sense of personal efficacy set high goals for themselves and feel increased commitment to them. Thus, it appears plausible to suggest that hardiness can influence the extent to which people set goals for themselves and how committed they feel in doing so. In turn, this could influence how self-efficacy exerts its effect on mental health outcome. Hardiness should also influence whether people choose challenging or safe activities. The hardiness literature give reason to suggest that hardiness influences self-efficacy levels as a result of its approach-oriented coping style and appreciation of challenging situations. Thus leading to the preference for challenging activities as seen in high self-efficacy individuals. Hardiness could also influence self-efficacy's role in self-motivation. Bandura (1997) claim that individuals are more likely to intensify their efforts if they believe in their ability to assure a desired outcome. Hardy people typically engage in situations where they feel in control of the outcome and will therefore have a sense of trust in that they are capable of guaranteeing the desired outcome. This could mean that hardiness influence the type of situation the individual engages in, with the result of enhancing self-efficacy. In other words, people with a high sense of self-efficacy could be driven by their hardy personality in making sure that they succeed. While the above discussion has been presented self-efficacy as a potential variable through which hardiness exerts its effect of health outcomes, the present study wishes to examine a second variable that appears relevant

for investigation, namely the influence of worry levels. The following section will therefore provide an overview of the worry concept and consider whether worrisome thinking is influenced by a pre-dispositional hardiness profile.

Worry

Being separated from friends and family has previously been suggested as a powerful stressor for sailors in the armed forces (Johnsen et al., 2007). Maddi (2013) propose that loneliness, detachment, and emptiness as a results of separation from family are salient stressors for military personnel that can inhibit successful coping. Combined with stressors that accompany work in potentially life-threatening environments, the military personnel are particularly susceptible to stress and worrisome thinking. Schumm and associates (2001) have found that family matters relate to soldier readiness, where the importance of readiness lies in its influence on effective adaptation to the military environment. Kirkland and Katz (1989) suggested military personnel, their families, and military units to be part of an interrelated system that can have supportive or harmful effects on each other. Within this they suggested that readiness is influenced by soldiers' ability to focus on mission requirement without being distracted by family worries. For instance, Oliver (1991) noted that stressful family situations have been shown to increase soldiers' vulnerability to battle shock. Among stressful elements she highlights sick family members, pregnant wife, and recent death in the family. In an attempt to examine individual experience of family related issues, Johnsen and associates (2007) investigated the relationship between family problems and support, coping style, and mental health among 187 crewmembers employed on an international operation. They found that a feeling of support from family and fewer concerns with family issues was related to problem-oriented coping strategies, and that worrying about family problems and family preparedness was negatively related to crewmembers mental health outcome (Johnsen et al., 2007). Thus, worry seems to be an important influence on military personnel's ability to effectively adjust to the military context.

Worrying is a common response to the anticipation of stressful events and is considered a central component of nearly all anxiety disorders (Brosschot, Gerin, & Thayer, 2006). To experience an exaggerated sense of worry also remains a basic feature of generalized anxiety disorder (GAD) and Posttraumatic Stress Disorder (PTSD) (Rapee & Barlow, 2002). Both disorders share the feature of persistent and generalized bias toward environmental threats (Rapee & Barlow, 2002). Moreover, GAD and PTSD are characterized by a preoccupation with cognitions about the possibility of threat, where PTSD patients are more concerned with external threats and distressing memories. In a study

of traumatized Cambodian refugee patients, Hinton and colleagues (2011) found that worry was common and that it often resulted in both catastrophic cognitions and trauma recall. They also found that PTSD was highly associated with worry-induced panic attacks (Hinton, Nickerson, & Bryant, 2011).

Borkovec and associates (1983) defines worry as a chain of thoughts and images that are negatively affect-laden and somewhat uncontrollable (Borkovec, Robinson, Pruzinsky, & DePree, 1983). Based on their research on insomnia they discovered that the worry process usually represents an attempt to actively engage in mental problem solving on uncertain issues that have the possibility of one or several negative outcomes. Thus, they propose that worry is closely related to fear processes. The concept of worry should not be confused with related and conceptually close concepts such as rumination, anticipatory stress and cognitive intrusions (Brosschot et al., 2006). Still, it is important to keep in mind that worry has been found to be a less clearly defined construct when compared to for example emotionality in related analyses (Hodapp, 1989). These concepts share a common feature, namely that worried people tend to engage in repetitive thinking. Brosschot and colleagues (2006) argue that these repetitive cognitions are responsible for the ill effects associated with facing environmental stressors. They refer to this as preservative cognition, and argue that this concept can shed light on the association between psychological stress and health outcomes. More specifically, they suggest that individuals whom engage in worrisome thinking experience a repeated or chronic activation of the cognitive representation of a psychological stressor, with the result that the individual preserve the cognitive response. In turn, preservative cognition assist in converting psychological stress-responses into prolonged physiological activation of multiple bodily systems, which has been related to the development of chronic pathogenic states (Brosschot & Thayer, 1998; McEwen, 1998; Brosschot et al., 2006). Their findings roughly imply that individual health outcomes will be influenced by how much the individual worries.

From the very beginning of research on the worry process it has been described as an active attempt at constructive mental problem solving accompanied by low confidence of success (Borkovec et al., 1983). Borkovec and associates (1998) suggested that worriers tend to repeat the first stage of the problem-solving process, whereby they identify an issue and its potential threats, and that they have trouble generating and applying solutions to the problem (Borkovec, Ray, & Stöber, 1998). However, later studies have revealed contrary findings. Davey (1994) provided findings for an association between worry and avoidance coping, as well as poor confidence in problem solving skills. Still, he was unable to

demonstrate a relationship between worry and problem solving effectiveness. Dugas and colleagues (1995) found that problem solving skills and avoidance coping was unrelated to worry, but that there was a strong relationship between worry and problem orientation (i.e. immediate cognitive reactions to problematic situations). Based on this, they suggested that worriers do have the necessary skills to engage in problem solving, but that the individual's appraisals and expectations may interfere with the ability to make use of their problem solving skills (Dugas, Letarte, Rhéaume, Freeston, & Ladouceur, 1995). Importantly, the findings presented above suggest that worry seem to be a somewhat opaque concept with diverse findings and different concepts tapping into one another. Based on the above discussion, the present study is interested in exploring a potential effect of hardiness on health outcome as a function of hardiness' influence on worry. The primary interest lies in the intuitive negative relationship between the hardy personality and high levels of worry.

The indirect influence of hardiness on mental distress through worry. As stated, hardy individuals are characterised by their ability to actively engage in successful coping strategies, their appraisal of stressful events as challenging as opposed to threatening, and their interpretation of physical arousal as a trivial features of life events that do not necessarily lead to harmful outcomes. It appears plausible to suggest that this generalised style of functioning could influence the extent to which people worry about features of their surrounding environment. The arguments for proposing an influence of hardiness on worry levels seem to gather around a consideration of three elements. First, that hardiness appears to influence worry by distinct patterns of cognitive and behavioural coping, and second, that it influences how individuals perceive controllability of stressful situations. Finally, hardiness can be suggested to influence how individuals interpret physical arousal.

The literature has claimed that hardy individuals are more likely to appraise stressful events as challenging rather than threatening, which in turn increase their ability to cope with stressors despite being worried about, for instance, family concerns. Appraising an event as threatening has been linked with both worry and unsuccessful coping, whereby worriers appear to fail in their attempts to engage in problem-focused coping. As seen, problem-focused coping is associated with high confidence of success. Because hardy individuals have been suggested to engage in more problem-focused coping rather than emotion-focused coping, it appears reasonable to suggest that hardy individuals worry less than their low hardy counterparts. This implies that worriers are more apt to avoid confronting problems and thereby reducing their problem solving performance (Davey, 1994). Consequently, appraising stressful events as threatening impede worriers' ability to

face the situation in an operational way, keep them from making a decision, and prevent them from mobilizing a plan of action.

Worried individuals also appear to be intolerant to the uncertainty that is inherent to problem solving and have reduced confidence in their abilities to solve problems, while hardy individuals typically believe that they can influence the course of events as a result of their perceived control over the situation. Because hardy individuals are believed to sense a control over the various aspects of their life, it seems likely that they will engage in less thinking about what could and should have been. More specifically, hardy individuals will attend to issues that they deem controllable and let go of problems they perceive to be uncontrollable. In turn, this will provide them with the ability to proceed with problem-focused coping without falling ill to the negative consequences of repetitive thinking.

A final argument for an influence of hardiness on worry is how high hardy and low hardy individuals interpret physical arousal. Kobasa (1979) suggested that hardy persons experience less physical arousal in dealing with stressful situations, or simply interpret physical arousal as a natural response that is inherently non-threatening. Accordingly, low hardy individuals are believed to experience more physical arousal in stressful situations, or appraise the presence of physical responses as something to fear, thus inhibiting the application of useful coping strategies. Implementing physical arousal as an explanation for the relationship between hardiness and mental health outcome derives from suggesting that physical arousal in low hardy persons lead to worrisome thinking, which in turn can have widespread influence on their coping abilities and their subsequent experience of mental distress. Having a hardy personality could possibly alleviate physical arousal that emerge as a response to the mentioned stressors associated with being parted from family and friends, including an ability to engage in other activities or seek support from other crewmembers. These arguments are supported by previously mentioned research that have found an association between worry, PTSD and GAD (Rapee & Barlow, 2002), as well as a link between hardiness, coping, and worrisome thinking (Johnsen et al., 2007). Based on the presented findings, it appears reasonable to suggest that the negative mental health effects associated with worrisome thinking can be the result of an underlying hardiness disposition.

Proposed mediation model

The foregoing discussion has provided the theoretical framework for proposing self-efficacy and worry as possible mediators of the hardiness-mental health relationship. Thus far, the literature has with some confidence been able to suggest that hardiness contributes to mental health functioning through environmental factors, neurobiological variables, and

individual characteristics. Still, a feature of previous hardiness research is that the majority of studies have investigated mediating effects in the hardiness-health relationship have used cross-sectional data collection (e.g. Allred & Smith, 1989; Williams et al., 1992; Soderstrom et al., 2000; Beasley et al., 2003). Importantly, tests of mediation require that individual reports be obtained at multiple stages. The most reliable results are obtained by reports of the mediators *after* measure of the independent variable and *before* measure of the dependent variable. Thus, the present study approached the proposed mediation model using a prospective cohort study that measures hardiness at stage one, self-efficacy and worry at stage two, and mental distress at stage three.

Based on the above arguments the present study aims to test the proposed mediation model presented graphically in Figure 1, as a non-reciprocal path model that involves an examination of self-efficacy and worry as potential mediators of the hardiness–mental health relationship. More specifically, it is hypothesised that hardy individuals will have an increased sense of self-efficacy and that low hardy individuals will have a decreased sense of personal efficacy. As for the mediating role of worry, it is proposed that hardy individuals experience less worrying than its lower hardy counterparts. This lead to the following hypotheses:

H1: There will be a negative relationship between personal hardiness and mental distress as a function of hardiness' influence on self-efficacy.

H2: There will be a negative relationship between personal hardiness and mental distress as a function of hardiness' influence on worry.

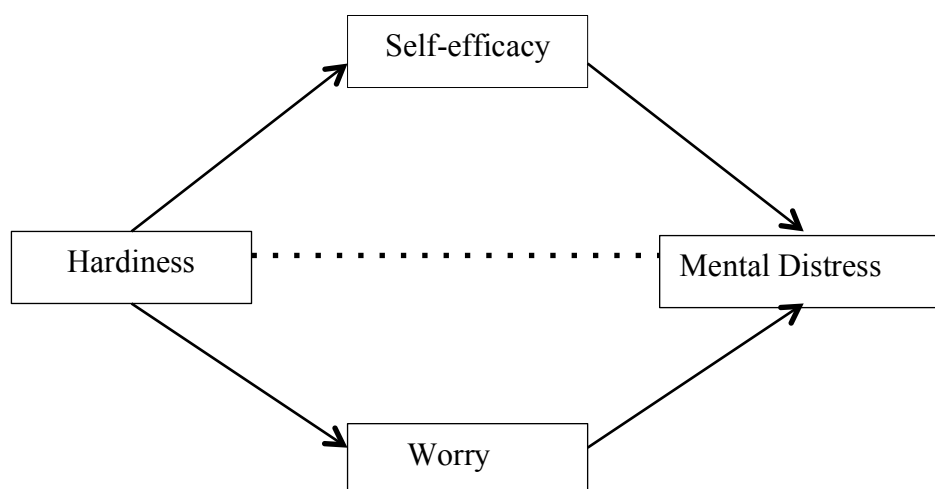


Figure 1

Proposed mediation model including Hardiness as DV, Mental Distress as IV, and Self-efficacy and Worry as mediator variables

Method

Participants

A total of 166 Norwegian crewmembers on naval vessels belonging to Operation Ocean Shield took part in the study, whereby 68 officers (41%) and 97 sailors/privates (58.4%) participated. One participant (0.6%) did not report military rank. Gender information was excluded for analysis due to confidentiality issues. The number of participants prior to deployment (Time 1, T1) was 219, whereby 168 (76.7%) provided valid responses to measures of hardiness, the Generalised Health Questionnaire (GHQ) and the Hopkins Symptoms Checklist (HSCL) included at T1. All subjects that provided valid responses at T1 also participated during deployment (Time 2, T2). The number of responses during deployment (T2) was 236, however two subjects did not provide valid responses to worry and self-efficacy thereby reducing the eligible sample size to 166. The number of participants at end of deployment (Time 3, T3) was 240. All participants with valid responses at T1 and T2 also participated at T3, however one participant did not provide valid responses to GHQ, reducing the sample size to 165 for the analysis involving GHQ.

Procedure

Operation Ocean Shield is NATO's (North Atlantic Treaty Organisation) counter piracy mission in the Gulf of Aden and off the Horn of Africa. The operation was initiated in an attempt to protect naval vessels and disrupt pirate attacks in addition to enhance the overall security level in the region. The collection of individual reports of the applied variables was obtained at three stages of deployment, including reports prior, peri, and post mission participation (Sanden et al., 2014).

Prior to participation (T1) in the operation the crewmembers are screened for mental readiness using a questionnaire containing measures of hardiness, GHQ, HSCL, military abilities, and family preparedness. Additionally, crewmembers are informed about the mission and potential threats to mental health. An important part of the preparation is to inform next-of-kin about similar matters in an attempt to prevent growth of a strained relationship between crewmembers and next-of-kin. Personnel with high scores on measures of anxiety, sleep difficulties, depression or low quality of life will be given individual consultation by a health care professional. If deemed unsuited for participation, these individuals can be refused to participate in the operation (Sanden et al., 2014).

Evaluation during deployment (T2) concerns an almost exclusive focus on crewmembers, including distribution of the standardised questionnaire and individual consultations if needed. Continuous follow ups of crewmembers also include conducting

focus groups where personnel have an opportunity to discuss how they experience the deployment and issues that could be improved for the remaining time. The master of the naval vessel is informed by the results from the questionnaire and focus groups, which provides the master with an opportunity to discuss possible interventions deemed necessary. During deployment the vessel leadership can inform next-of-kin using social media where they can post pictures and comments on a continuous basis. The master is also required to write a letter every two weeks that is distributed to crewmembers families (Sanden et al., 2014).

The third phase of data collection (T3) was obtained in transit at end of deployment, however before signing off and preferably carried out on board the vessel. Similar to prior assessment, in transit evaluation includes distribution of the standardised questionnaire and conduction of focus groups. Similar to evaluation during T1 and T2, crewmembers will be given individual consultation if needed. However, during transit the nature of conversation shifts from an attempt to enhance a sense of agency during deployment, to summarising the experience of being part of an internal operation. Additional focus is given to challenges associated with returning back home and settling into everyday routine (Sanden et al., 2014).

Instrumentation

The Dispositional Resiliency Scale. Hardiness was measured using a Norwegian adaption of the 15-item Dispositional Resiliency Scale (DRS-15; Bartone, 1995; Hystad, Eid, Johnsen, Laberg, & Bartone, 2010). The DRS-15 includes 15 statements requiring subjects to indicate agreement on a 4-point scale ranging from *not at all* true to *completely true*. An example item is “By working hard you can nearly always achieve your goals”. Six negatively keyed items require reversing. A total hardiness score was calculated based on mean-scores of all items. If desired, three subscale scores can be created by adding relevant items to the three dimensions of hardiness; control, commitment and challenge. The current study used a total hardiness score for the final analyses.

Mental health outcome. Mental distress was measured using the 12-item version of the General Health Questionnaire (GHQ-12) and the 25-item version of the Hopkins Symptom Checklist (HSCL-25). While the scales share common characteristics, the GHQ is more concerned with somatic complaints in addition to measuring psychological distress than the HSCL. HSCL has been identified as “the temperature measure” of psychological distress, meaning that it indicates presence of distress without defining what the problem is (Sandanger, Moum, Ingebrigtsen, Dalgard, Sørensen, Bruusgard, 1998).

The General Health Questionnaire (GHQ). The GHQ (Goldberg & Hillier, 1979) is a widely used self-report instrument designed to measure psychological distress across four areas: anxiety and insomnia, somatic symptoms, social dysfunction and severe depression. The current study used the 12-item version of the GHQ, where subjects are asked to describe their health during the last couple of weeks on a 4-point scale ranging from *better than usual* to *much less than usual*. Sample items include “Over the past few weeks, have you been able to concentrate on whatever you’re doing?”, “Over the past few weeks, have you lost much sleep because of worry?”, and “Over the past weeks, have you been feeling unhappy and depressed?”. A summary score of GHQ was computed on the basis of a mean-score of all items.

The Hopkins Symptom Checklist (HSCL). The HSCL-25 is a screening instrument designed to recognise mental health problems, including symptoms of anxiety and depression (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974; Hesbacher, Rickels, Morris, Newman, & Rosenfeld, 1980; Nettelbladt, Hansson, Stefansson, Borgquist, & Nordström, 1993). The 25 item HSCL consists of two parts, where the first section include 10 items for measuring anxiety symptoms, and the second section includes 15 items for measuring symptoms of depression. The subjects are asked to indicate their agreement on a 4-point scale ranging from *not at all* to *extremely*. The present study composed a total score by combining the mean score of all 25 items, as supported by previous research (Hesbacher et al., 1980). The HSCL has been successfully translated for use into a number of different languages, including Norwegian, as used in the present study (Sandanger et al., 1998; Lavik, Laake, Hauff, & Solberg, 1999).

Measurement of self-efficacy

Self-efficacy was measured using a scale labelled Military Skills and Abilities. It is a version of an originally developed questionnaire based on interviews with Norwegian United Nations (U.N.) observers and personnel serving in Bosnia between 1992 and 1995 (Solberg, 1997). Items were originally based on questions considered important to cope with stressful situations, but later developed into a measure of military coping after international operations (Solberg et al., 2005). The scale was selected for the current study due to its suitability for military samples. The questionnaire consists of 20 items where the subjects are asked to indicate ability on a 6-point scale ranging from *very poor* to *very good*, including an *I do not know*-option. Sample items include “My ability to act although feeling threatened is ...” and “My ability to deal with stress is ...”. The questionnaire has been adjusted to fit the current sample and context, and may therefore slightly differ from

previous versions. For instance, military abilities are referred to as military abilities on a navy vessel.

Measurement of worry

Worry was measured using four questions derived from previous work by Johnsen and associates (2007). Subjects were asked to indicate agreement on a five-point scale ranging from *very little* to *very much*. Item 2 and 3 were reversed for statistical analysis. The four following questions were used:

1. To what extent do you worry about the family back home?
2. To what extent do you think your family was prepared for the mission?
3. To what extent do you feel supported by family members during the mission?
4. To what extent do you miss family and friends in Norway?

Statistical analysis

Hypothesis 1 and Hypothesis 2 propose an indirect effects model, where the association between hardiness and mental health is transmitted either through self-efficacy or worry. Data analyses were performed with SPSS, including PROCESS macros provided by Andrew Hayes (Hayes, 2013). Descriptive statistics were calculated for the main study variables, and bivariate relations tested with Pearson correlations as shown in Table I.

Traditionally, tests of mediation were performed using Baron and Kenny's (1986) causal steps approach. This approach examines the causal model by doing tests of significance for each path in the model. The first step is establish a relationship between X and Y, which is based on an assumption that X and Y are significantly related and that an mediating effect cannot occur unless there is an established relationship between these two. This association is signified as the total effect of X on Y (denoted as c). If the first criterion is met, then the first step is to assess the effect of X on mediator M (signified as a). If there is a significant effect of X on M, the second step will be to estimate the effect of M on Y while controlling for X (signified as b). The effect of X on Y is here signified as the direct effect (c') of X. In the case of a significant effect by M on Y, the total effect c is compared to the direct effect c' to evaluate the degree of mediation taking place. If c is greater than c' and c' is no longer statistically different from zero, then the effect of X on Y is said to be in full mediated by M. However, if c is greater than c' and still statistically significant, then M partially mediate the effect of X on Y. This implies that a failure to reject the null hypothesis in any of the above tracks can halt the mediation analysis midway.

The causal steps approach is now recognized as being inadequate for assessing mediating relationships (MacKinnon, Lockwood, Hoffman, West & Sheets, 2002; Zhao,

Lynch, & Chen, 2010; Hayes, 2009, 2013). For instance, critics have questioned the causal model's requirement of a significant relationship between X and Y in order to infer indirect relationships. Many methodologists now agree that it is possible for X to have an influence on Y through M without the presence of a significant effect of X on Y (Hayes, 2013; Zhao, et al., 2010; LeBreton, Wu, & Bing, 2009). Rather, critics claim that the only requirement to establish mediation is that the indirect effect $a \times b$ is significant. A second criticism is that the mediation in the causal steps approach is inferred from the outcome of a series of tests on the individual paths in the model, but not the indirect effect itself. It seems unnecessary and inconvenient that three different null-hypotheses will need to be tested in order for a mediation to occur. Thus, critics have claimed that tests of mediation should not be done on path a and b , but rather on the estimate of the indirect effect $a \times b$.

Moreover, Baron and Kenny (1986) recommended using the Sobel z-test in testing for significance of the indirect path $a \times b$. The Sobel z-test is limited by its assumption that the sampling distribution is normal, which in the case of indirect effects usually does not apply. The indirect effect is usually not normally distributed, as it is the product of two parameters. When the indirect path $a \times b$ is positive there will be a positively skewed sampling distribution, where the end of the distribution is closer to zero and a shorter tail to the left. The Sobel test puts the 95% confidence intervals around the mean estimate of $a \times b$, implying that the lower bound of the confidence interval for a positive $a \times b$ has less than 2.5% of the true sampling distribution to the left (Zhao et al., 2010). Thus, the 95% confidence interval will often incorrectly include zero. In order to confront and solve these issues, Preacher and Hayes (2004) developed SPSS syntax for an alternative bootstrap test of the indirect effect. The bootstrap test solves the problems associated with sample distribution by generating an empirical sampling distribution of $a \times b$. It takes the sample of size N and draws from it a replacement N value of (X, M, Y) to create a new sample. After, for instance, 5000 such bootstrap samples are drawn and $a \times b$ are estimated for each, the SPSS macro sets up a 95 % bootstrap confidence interval for the indirect effect by removing the top and bottom 2.5 % of the empirical distribution. If the bootstrap confidence interval does not include zero, the indirect is taken to be significantly different from zero.

Based on the above discussion, the present study used the PROCESS procedure for SPSS (Hayes, 2013) to estimate the indirect effects, with bootstrap confidence intervals to test the indirect effects directly. The present study used 5000 bootstrap resamples to estimate the 95% confidence intervals for the indirect effects. All regression weights presented are unstandardized Betas.

H1: In estimating indirect effects for self-efficacy as a mediator (M), two separate analyses were performed. These will be referred to as H1₁ and H1₂, as they indicate hardiness' influence on the GHQ and the HSCL, respectively. In the first analysis, self-efficacy was hypothesized as a mediator of the relationship between hardiness (X) and health (Y) as measured by GHQ. In the second analysis, self-efficacy was hypothesized as a mediator of the relationship between hardiness (X) and health (Y) as measured by HSCL.

H2: The next step was to estimate indirect effects of worry as a mediator (M). Two separate analyses were performed. These analyses will refer to H2₁ and H2₂, as they indicate hardiness' influence on the GHQ and the HSCL, respectively. First, worry was hypothesized as a mediator of the relationship between hardiness (X) and health (Y) as measured by GHQ. Secondly, worry was hypothesized as a mediator of the relationship between hardiness (X) and health (Y) as measured by HSCL.

Results

In order to examine the relationship between hardiness, mental health, and the mediating variables self-efficacy and worry, zero-order correlations between these variables were calculated as presented in Table I. Table I also include means, standard deviations, Cronbach's Alpha, and ranges for all scales used. The analyses revealed that there is no total effect of hardiness on the remaining variables used. There are significant correlations between worry and GHQ pre (.33**) and GHQ post (.21**), and for worry and HSCL pre (.37**) and HSCL post (.24**). Thus indicating that higher degree of worry is positively related to mental health issues for both GHQ and HSCL. The results show that self-efficacy correlates with HSCL pre (-.22**) and GHQ post (-.18**), thus suggesting individuals that report high self-efficacy have better general health outcome than individuals that report lower degrees of self-efficacy. As previously discussed, the traditional approach to test for mediation as outlined by Baron and Kenny (1986) were based on an assumption that X and Y are significantly related. Today, most methodologist contend that there need not be a significant relationship between X (hardiness) and Y (mental health) for mediation effects to be detected. Based on this acknowledgement, subsequent analyses were performed to test for mediation.

In order to test the first hypothesis proposing that self-efficacy serves as a mediating variable in the hardiness-mental health relationship, a series of regression analyses was conducted. The same procedures were done to test the second hypothesis, which proposed that worry operates as a mediating variable in the hardiness-mental health association. These tests of mediation were performed in order to assess whether the effects of hardiness on

mental health could be explained as a function of its effect on self-efficacy and worry. Thus, according to the proposed hypotheses, hardiness should influence self-efficacy and/or worry, which in turn should influence mental health. Health was measured using two similar, yet parametrically distinguishable, instruments. Thus the hypotheses were tested a total of two times, first with the 12 item GHQ as the independent health variable, and second with the 25 item HSCL. The regression results are presented in Table II and Table III, respectively. Baseline ratings on GHQ and HSCL obtained at Time 1 were included in both models as covariate variables. The following presentation of the results will have a predominant focus on the indirect effects.

Table I
Means, Standard Deviations, and correlations among the main study variables (N=166)

	M	SD	α	Range	1	2	3	4	5	6	7
1 Hardiness	2.6	.49	.77	1 – 4	-						
2 GHQ pre	1.72	.24	.68	1 – 4	.00	-					
3 Self-efficacy	3.74	.72	.91	1 – 5	-.12	-.12	-				
4 Worry	2.26	.59	.51	1 – 5	.03	.33**	-.03	-			
5 HSCL pre	1.17	.18	.83	1 – 4	-.05	.54**	-.22**	.37**	-		
6 GHQ post	1.78	.31	.78	1 – 4	.07	.53**	-.18*	.21**	.31**	-	
7 HSCL post	1.17	.23	.86	1 – 4	.07	.52**	-.09	.24**	.40**	.66**	-

Note * $p < .05$ ** $p < .001$, GHQ = General Health Questionnaire; HSCL = Hopkins Symptoms Checklist, α = Cronbach's Alpha.

Indirect effects of hardiness on mental health (GHQ)

The indirect effects model (X – M – Y) showed no mediational role for self-efficacy on the association between hardiness and GHQ score (H1₁). The bootstrap test revealed an unstandardized indirect effect of $B = 0.01$, whereby the 95% confidence interval contained zero (-0.00, 0.03). Thus, the model provides no support for hypothesis 1. These results suggest that hardiness does not influence mental health indirectly as a function of hardiness' effect on self-efficacy. Similarly, it suggests that the significant relationship between self-

efficacy and post-measures of GHQ was not a result of hardiness score. The results from the regression analyses on H2₁ found no mediational role for worry on the association between hardiness and GHQ score. Bootstrap results revealed an unstandardized indirect effect of 0.00, whereby the 95% confidence interval contained zero (-0.01, 0.02). Thus, the model provides no support for hypothesis 2 and thereby fails to provide support for the claim that hardiness influence mental health as a function of decreased degrees of worrisome thinking. Moreover, it suggests that the significant relationships between worry and GHQ post was not due to hardiness score.

Indirect effects of hardiness on mental health (HSCL)

The indirect effects model (X – M – Y) showed no mediational role for self-efficacy on the association between hardiness and HSCL score (H1₂). The bootstrap test revealed an unstandardized indirect effect of $B = 0.00$, whereby the 95% confidence interval contained zero (-0.01, 0.01). Thus, the model provides no support for hypothesis 1. These results suggest that hardiness does not influence mental health indirectly as a function of hardiness' effect on self-efficacy. The regression analyses for examining the mediating role of worry on the association between hardiness and mental health revealed no effect (H2₂). Bootstrap results revealed an unstandardized indirect effect of $B = 0.00$, whereby the 95% confidence interval contained zero (-0.00, 0.02). Thus, the model provides no support for hypothesis 2 and thereby fails to provide support for the claim that hardiness influence mental health as a function of decreased degrees of worrisome thinking. Likewise, it suggests that the significant relationship between worry and post measures of HSCL was not a result of hardiness score.

Table II
OLS Regression Results for Indirect Effects of Hardiness on General Health Complaints (GHQ) Through Self Efficacy and Worry (n = 165)

Variable	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	LLCI	ULCI
<i>Direct and Total Effects</i>						
X → M1: Self efficacy regressed on Hardiness	-0.18	0.11	-1.534	.13	-0.40	0.05
X → M2: Worry regressed on Hardiness	0.03	0.09	0.355	.72	-0.14	0.21
X → Y: General health Complaints regressed on Hardiness, controlling for M1 and M2 (Direct effect)	0.03	0.04	0.739	.46	-0.05	0.12
X → Y: General health complaints regressed on Hardiness (Total effect)	0.04	0.04	0.957	.34	-0.04	0.12
	<i>B</i>	<i>Bootstrap SE</i>	<i>Bootstrap LLCI</i>	<i>Bootstrap ULCI</i>		
<i>Bootstrap Results for Indirect Effects</i>						
X → M1 → Y: Indirect effect of Hardiness on General Health Complaints via Self efficacy	0.01	0.01	-0.003	0.034		
X → M2 → Y: Indirect effect of Hardiness on General health complaints via Worry	0.001	0.004	-0.005	0.015		

Note. LLCI = Lower limit confidence interval. ULCI = Upper limit confidence interval. General health complaint at Time 1 was included as a covariate.

Table III
OLS Regression Results for Indirect Effects of Hardiness on Hopkins Symptoms Checklist Through Self Efficacy and Worry (n = 166)

Variable	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	LLCI	ULCI
<i>Direct and Total Effects</i>						
X → M1: Self efficacy regressed on Hardiness	-0.18	0.11	-1.611	.11	-0.40	0.04
X → M2: Worry regressed on Hardiness	0.05	0.087	0.60	.55	-0.12	0.22
X → Y: General health Complaints regressed on Hardiness, controlling for M1 and M2 (Direct effect)	0.038	0.034	1.12	.266	-0.03	0.105
X → Y: General health complaints regressed on Hardiness (Total effect)	0.04	0.034	1.19	.237	-0.027	0.106
	<i>B</i>	<i>Bootstrap SE</i>	<i>Bootstrap LLCI</i>	<i>Bootstrap ULCI</i>		
<i>Bootstrap Results for Indirect Effects</i>						
X → M1 → Y: Indirect effect of Hardiness on General Health Complaints via Self efficacy	0.00	0.005	-0.011	0.012		
X → M2 → Y: Indirect effect of Hardiness on General health complaints via Worry	0.002	0.004	-0.003	0.017		

Note. LLCI = Lower limit confidence interval. ULCI = Upper limit confidence interval. General health complaint at Time 1 was included as a covariate.

Discussion

The present study represents an attempt to clarify the proposed association between psychological hardiness and mental health outcome in a military sample. The existing literature on hardiness, stress, and mental health provided the basis for two hypotheses, where self-efficacy and worry were proposed as mediating variables in the relationship between hardiness and health. Ultimately, the present study was unable to obtain support for the proposed mediation model. Regression analyses revealed no direct effect of hardiness on mental health outcome, and no indirect effect of hardiness on mental health through the mediating role of self-efficacy and worry. There are two main explanations for the present research findings. First, that hardiness does not influence mental health outcome through self-efficacy and worry levels. And second, that there is certain methodological limitations to the present research design and sample that could mask potential effects. The following discussion will first deliberate upon the research findings in regard to previous studies that have investigated the relationship between hardiness and health, before proceeding to a re-evaluation of self-efficacy and worry as mediator variables in the said association. Subsequent attention will be given to the methodological strengths and limitations of the present study, including data collection design, sample characteristics, contextual influences, and the applied measurements used. Finally, consideration will be given to common criticisms of the hardiness literature, recent advancements in the field, and the future of hardiness research.

Hardiness and mental distress

Contrary to early findings by Kobasa (1979), the present study did not find support for an association between hardiness and mental health outcome. The results are also inconsistent with a range of studies that have found an association between hardiness and psychological and physiological distress (Kobasa et al., 1981; Kobasa et al., 1982; Kobasa et al., 1982; Kobasa et al., 1983; Kobasa & Puccetti, 1983; Maddi & Kobasa, 1984; Bartone, 1999, 2000; Beasley et al., 2003; Hanton et al., 2003; Escolas et al., 2013; Bartone et al., 2015). Taken together, the present research findings do not support the claim that high hardy individuals manage stressful events better than their low hardy counterparts. The following discussion will highlight central features of the present study and present possible explanations for the research findings, with initial attention given to the proposed mediating role of self-efficacy and worry in the hardiness-mental health association.

Re-evaluating the mediating role of self-efficacy in the hardiness-mental health relationship

The present study hypothesised that there would be a positive relationship between personal hardiness and health outcome as a function of hardiness' influence on self-efficacy. The hypothesis was based on the assumption that high hardy individuals' sense of control over the course of life events, commitment to such events, and the appraisal of stressful situation as something challenging rather than threatening, would influence the development of self-efficacy and assure continued growth of efficacy beliefs. In turn, the elevated beliefs of personal efficacy were thought to influence mental health outcome in a positive direction. Based on the intuitive association between hardiness and self-efficacy in general, and the relationship between hardy control and the exercise of personal agency specifically, it appears somewhat unexpected that there was no observed effect on mental health outcome as a function of hardiness' influence on self-efficacy. Although speculative, an explanation for the research findings is that hardiness and self-efficacy exert their effect on mental health outcome through different cognitive and behavioural routes in the present sample. Thus indicating that hardiness influence mental health outcome independent of self-efficacy levels. However, because there was no total effect of hardiness on mental health outcome in the present sample this remains an unlikely explanation. It could mean that hardiness influence mental health outcome through other mediating variables not included in the proposed model, including variables that have previously been associated with hardiness such as appraisal mechanisms and coping strategies (Gentry & Kobasa, 1984; Williams et al., 1992; Bartone, 2015). Indeed, Bonanno (2004) stated that hardiness is merely one of several pathways leading to resilience, and the foregoing argument should therefore not be understood as an argument against the role of self-efficacy in assuring good mental health outcomes.

A second explanation for the present findings regards the instrument used to measure self-efficacy. The instrument used does not explicitly refer to 'self-efficacy' but 'military skills and abilities' (Solberg et al., 2005). Nonetheless, the scale is highly correlated with the Norwegian translation of the "General Self-efficacy Scale" (Schwarzer & Jerusalem, 1995; Leganger, Kraft, & Røysamb, 2000; Solberg et al., 2005), which has been shown to obtain satisfactory psychometric characteristics with high reported levels of internal consistency across various circumstances (Luszczynska, Scholz, & Schwarzer 2000). Nevertheless, it is necessary to acknowledge that the military skills and ability scale is composed by items that

reflect deployment on a naval vessel. This include items that refer to abilities in coping with stress in situations characterised by a substantial degree of danger, threat, demands of physical capacity, and so forth, whereby additional items refer specifically to peacekeeping missions and naval military abilities. Nevertheless, because self-efficacy is regarded a generative capability that is highly context-dependent (Bandura, 1997), it appeared only reasonable to include a context-specific measure of self-efficacy that accounted for the particular circumstances. Still, it is important to acknowledge that the present study provides little information about how hardiness can influence self-efficacy in people under different environmental conditions. The remaining discussion will include additional features of the present study that could have interfered with the proposed influence of hardiness on mental health through self-efficacy. Prior to this, a consideration of worry as a mediator variable will be attended to.

Re-evaluating the mediating role of worry in the hardiness-mental health relationship

Hardiness was proposed to influence worry based on hardy individuals proposed resiliency to physical arousal and their ability to actively engage in problem solving with high confidence of success. Worriers have typically been identified in the literature as individuals that experience enhanced physical arousal or interpret such signals as threatening. Combined with the inability to actively engage in problem solving strategies that yield desired outcomes, it was hypothesised that worriers would obtain a low score on the hardiness measure. Few studies have investigated an association between hardiness and worry, but Johnsen and associates (2007) found that coping style was related to worry and mental health outcome in Norwegian navy crewmembers. More specifically, crewmembers that engaged in problem solving reported less worries about family concerns. In turn, avoidance focused coping was related to higher reports of worry about family issues, with increased worry being associated with poorer mental health outcomes. While findings from the present study are inconsistent with these observations, there are some concerns worthy of attention. The following discussion will attempt to explain the research findings by considering the concept of worry and how to measure it, attending to the experience of stress on board and whether Operation Ocean Shield qualifies as a highly stressful situation. Final consideration will be given to the appraisal of stress and whether this is associated with hardiness in the present sample.

First, explaining the study findings should attend to the concept of worry. Researchers have pointed out that worry appears to be a somewhat cloudy concept that shares a number of common characteristics with other concept. Examples include as

rumination, anticipatory stress, and cognitive intrusions (Hodapp, 1989; Brosschot et al., 2006). Inevitably, this questions the validity of the present research findings. It is plausible to question whether the present study, and previous studies at that, actually measures worry. It is conceptually difficult to infer relationship or causality if there are uncertainties associated with the theoretical basis of the variables applied. The present study used a measure of worry that aims to reveal tendencies in worrying about family issues, which is not a very generalised measure of worry. It would therefore be incorrect to apply the present research findings to people under different circumstances.

The problem with the worry measure in the present sample is that the items may fail to adequately measure worrisome thinking. The applied measure of worry was based on Johnsen and colleagues' (2007) study that found a significant effect of worry on coping strategies using this measure of worry. Still, contrary to more established measures of non-pathological worry, such as The Worry Domains Questionnaire (WDQ; Tallis, Eysenck, & Mathews, 1992) and The Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) this measure consists of only four items that involves worrying about separation from family and friends. Although these items are consistent with patterns of worry in the military samples it is still necessary to acknowledge that these items may not measure worry to an extent that provides statistical value. Thus, a recommendation for future studies that wishes to elaborate on worry as a mediator in the hardiness-health relationship may attend to this issue and examine the mediated effect using a potentially stronger measure of non-pathological worry. It is also worth to mention that the statistical analyses revealed a poor internal consistency (Cronbach's Alpha = .51). Although this could be due to the small number of items, it should still be considered a limitation of the present study. The conceptualisation of worry taps into a second issue, namely that the vast majority of research on worry regard worry as a core feature of anxiety disorders such as GAD and PTSD, with the consequence that measures of worry are used to predict mental health disorder that involve diagnostic criteria. Certainly, not all individuals that engage in worrisome thinking meet the diagnostic criteria for these disorders (Stöber, 1998). Interestingly, studies have found that anxiety (of which worry is a feature) can both enhance and inhibit performance (Seipp, 1991). Stöber (1998) states that distinguishing between pathological and non-pathological worry can help explain some of the variance in such research findings. Indeed, Davey (1994) suggests that pathological worry might increase maladaptation and dysfunction in facing stressful situations, but that lower levels of worry in the non-pathological worrier might in fact benefit the individual to adapt and construct

elements that are useful while analysing problems. Roughly adapted to the present study this could mean that hardiness only influence mental health outcome in individuals that experience pathological worry, and that none of the participants in the present study meet diagnostic criteria of such anxiety disorders. In turn, their low levels of worry could in fact enhance their ability to deal with salient stressors in their environment. An interesting topic for future studies could be to investigate the proposed mediation model in a sample with both pathological and non-pathological worriers. This could provide important understandings into how hardiness functions, and perhaps provide further insights into whether hardiness is best measured as a resiliency factor in situations characterised by particularly high degrees of stress. If detecting effects of stress on mental health requires a highly stressful situation it appears necessary to outline the possible stressors for participants in the present sample.

Bartone and colleagues (1998) investigated the potential sources of stress in military peacekeeping operations and found that general stressors include family separation, boredom and isolation. Importantly, they argue that peacekeeping operations vary between different operations and place different degrees of stress on the participant. Consequently, the stressors for the present sample should include separation from family and friends, boredom, isolation, as well as the potential threat of piracy attacks. Still, as outlined by Sanden and colleagues (2014) there is a substantial degree of attention given to inhibit the negative consequences commonly associated with stress, presumably implemented based on findings from studies like Bartone and colleagues' (1999). Sanden and associates (2014) state that prior to deployment the participants are screened for mental health issues, including anxiety, sleep problems, low quality of life, and depression (Sanden et al., 2014). Subjects that report high scores on these measures will be given individual consultation by a health care professional and will be refused to participate in the operation if deemed not suited for deployment. Thus, the participants were considered mentally healthy prior to deployment. In addition to this, the Norwegian Navy are responsible for continuous follow-ups of crewmembers to ensure that they stay healthy during the operation. This means that possible onset of worrisome thinking will be picked up by health care professionals, whereby crewmembers will given additional consultation (Sanden et al., 2014). This is done in order to prevent increased growth of physical distress. Although this is a well-intended measure to assure good mental health outcome in crewmembers it could have biased the present results. Certainly, it is difficult to examine hardiness' influence on mental health outcome through worry levels when external forces take action in alleviating symptoms of

distress at early onset. On the other side, the use of healthy individuals should be considered a strong feature of the present study. This is because significant effects could be attributed to stress experienced while participating in the operation. Because the study findings revealed no such effect supports that the link between hardiness and mental health outcome is not affected by hardiness' influence on worry levels. The observation that participants remain healthy despite deployment should also consider historical changes in the nature of peacekeeping missions.

Historically separation from family and friends is considered one of the most powerful stressors for sailors in the armed forces (Johnsen et al., 2007). Today, parting from familiar environments and acquaintances is arguably a quite different matter. Already in the late nineties Bartone and associates (1999) suggested that stress associated with isolation, boredom, and separation from family can be reduced by improving methods of communication and distribution of information to operation participants and their family. They highlight the use of media reports, newsletters, and frequent command briefings as counter measures to reduce the sense of isolation while being separated from family and friends. Sanden and associates (2014) summarise the procedural features of attendance on Norwegian navy operation. Among the procedures is giving crewmembers and their families a thorough introduction into important individual and environmental features of operation participation prior to deployment. Moreover, crewmembers have access to cell-phones and social media, which leads to easier access and continuous updates from family at home that can help alleviate worry and distress associated with separation. These modern features of participation on vessels in the Norwegian navy question the presence of stressors in Operation Ocean Shield.

Importantly, resilience is considered a positive adaptation in contexts characterised by significant adversity or risk (Masten & Reed, 2005). Thus, resiliency requires that individuals must experience a threatening situation followed by a positive adaptation response (Hystad, 2011). Taken together, this implies that the expression of hardiness in the present sample will only be evident if the participants experienced stress, and it is uncertain whether the participant actually experienced high degrees of stress. As stated, participation in a peacekeeping operation can pose unusual social-psychological challenges and operational stressor for the crewmembers, and the identified stressors in the present study seem to reflect stressors commonly associated with adaptation to the military context (Bartone et al., 1998). However, deployment on an international operation today is no longer synonymous with zero communication with family member, and stress associated with

loneliness, boredom, and separation from friends appears to be less prominent today than it was a couple of decades ago. Consequently, the present sample is arguably of reduced relevance for a model that depends on the experience of stress. Several studies have suggested that hardiness only exert its effect on mental health in situations characterised by high degrees of stress (Bartone, 1999; Taft, Stern, King, & King, 1999). Bartone (1999) observed that hardiness exert modest effects in situations defined by low stress, whereas stronger effects are reported under high-stress conditions. The low reports of mental distress in the present study could reflect a low presence of stressors, which in turn could have made it difficult to detect effects of hardiness. Defining a situation as highly stressful need to consider how participants perceive threat and whether this results from having a hardy personality style.

Lazarus (1999) claimed that the appraisal of an event as stressful varies across situations, whereby environmental variables that influence appraisal include dimensions of novelty-familiarity, clarity of meaning-ambiguity, and predictability-unpredictability. In situations where circumstances are characterised by familiarity, clarity and predictability individuals are more likely to appraise an event as being challenging rather than threatening, just as novel situations and unpredictability can lead to appraisal of stress as something to fear. Bearing in mind that the crewmembers in the present sample were selected for deployment on the specific operation it appears plausible to assume that they are acquainted with the military settings and therefore regard certain aspects of the experience as familiar and predictable, particularly the aspects of loneliness, boredom, and separation from family. Naturally, security personnel will often be exposed to uncertainty and threat but they are arguably more familiar with the risk of threat and the best coping strategies for dealing with such situations. In turn, this could lead to an appraisal of a stressful event as challenging as opposed to threatening, which could influence how they choose to behaviourally cope with the stressor and subsequent mental health outcome. Key here is that the environmental context explains the appraisal of an event as challenging, not necessarily having a hardy personality disposition.

Overall, the present study highlights issues concerning the use of worry as a mediator in the hardiness-mental health association. Issues related to conceptualisation, measurement, and the diagnostic distinction between pathological and non-pathological worriers has been presented. The foregoing argument has outlined limitations regarding the measure of worry and suggested improvements for studies that wish to examine the interaction between hardiness, worry, and mental health in the future. Attention was given to the potential

influence of circumstantial variables and questioned the nature of stressors in military operations. It has been proposed that historical alterations in the procedures of military operations have provided crewmembers with increased opportunities for alleviating stressors commonly associated with participation in international operations, which in turn could have influenced the findings. The following discussion will proceed to present important strengths and limitations regarding data collection, additional sample characteristics, and issues concerning the applied measures of mental health and hardiness.

Methodological strengths and limitations

Data collection and sample characteristics. As noted, an important methodological feature of hardiness research is that most studies have used cross-sectional data collection to ascertain a relationship between hardiness and good mental health outcomes, although with notable exceptions (e.g. Florian et al., 1995; Johnsen, Hystad, Bartone, Laberg, & Eid, 2014; Bartone et al., 2015). Cross-sectional designs are used to gather individual reports of internal states at one time point (Lindell & Whitney, 2001). This entails that studies have investigated the hardiness-health association by measuring hardiness and mental health at the same time. There are a number of advantages with obtaining cross-sectional data, including the possibility to record exposure to many risk factors and the ability to assess more than one outcome. However, such studies are limited because data on each subject are recorded only at one time point, which makes it difficult to infer the temporal relationship between a factor and the outcome. Cross-sectional studies are therefore useful in establishing an association between a set of variables, but does not allow for causation to be inferred from the results. Thus, researchers may report an association between a personality disposition and an outcome, but it provides generally little evidence that the disposition causes the outcome. Moreover, cross-sectional designs of both predictor and criterion make responses vulnerable to common method variance and response styles. For reasons outlined above, the present study examined the proposed mediation model using a prospective cohort design. A prospective cohort study follows a group of individuals who differ with respect to certain variables in an attempt to reveal how these variables influence a certain outcome (Manolio, Bailey-Wilson, & Collins, 2006). This method of data collection is useful in studies that aim to investigate causality in that none of the subjects have developed the proposed outcomes at baseline rating. Prospective studies are particularly important for mediation analyses since they require that the selected variables be measured at different points in time. More specifically, it proposes that mediating variables must be measured after the independent variable and before the

dependent variable. This means that self-efficacy and worry must be measured after an initial report of hardiness and before reports of mental health. Still, most studies fail to consider this fact and have tested for mediation using one or two time points where they measure the mediating variables at the same time point as the independent or the dependent variable. The applied method for data collection in the present study should therefore provide reliability to the findings. A related strength of the present study is the low attrition rates. Previous research has identified prospective studies as particularly vulnerable to attrition rates (Ahern & Le Brocque, 2005). For the present study the number of reliable responses at stage one was 168, whereby 166 (165 for GHQ) of these provided reliable reports at stage two and three. If attrition rates were high this could indicate that certain subjects opted out of the study as a result of mental health difficulties. Therefore, the low attrition rates provide reliability to the present study as it suggests that the participants maintained good health in the duration of the operation. Nevertheless, there are separate methodological concerns with the present study that require attention. For instance, the use of self-report questionnaires commonly questions the reliability of research findings. An important concern involves the potential influences of common method variance.

Method variance refers to situations where variance is credited to the measurement method rather than the constructs the measurement represents, which makes it difficult to infer valid conclusions about the relationships between variables (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Method variance can either deflate or inflate perceived relationships between concepts thereby leading to both Type I and Type II errors. Based on this acknowledgement it is necessary to address some of these biases, and how they can relate to the present findings. Method biases can occur from multiple sources, including the characteristics of items used in the questionnaires and common rater problems. A thorough account of the numerous sources of common method variance is beyond the scope of the present study, and therefore only a few relevant sources will be elaborated upon. One common rater problem is social desirability rating. Crowne and Marlowe (1996) suggested that individuals want to present themselves in a favourable light, and therefore end up responding to questions based on how they want to be perceived, which does not necessarily reflect their true behaviours and attitudes (Podsakoff et al., 2003). This tendency could have caused problems in the present study. As discussed, the military operational setting is particularly involved with high expectations to effective conduct of work related tasks. Bearing this in mind, it is reasonable to suggest that military personnel will be concerned with how they come across. To some, the military personality may represent an individual

that is characterised by strong mental health and high means of efficacy, which can lead to the present participants responding to the questionnaire with this image in mind. Also, as they have been deployed on the operation they might perceive themselves as representatives of this personality type and respond accordingly. In turn, this could mean that they are reluctant to rate any signs of mental distress, as this is inconsistent with the ideal military personality. A related topic regards anonymity. Study participants were asked to report both name and social security number, which makes it possible for the employer to identify individuals and their corresponding response. Thus, it remains a possibility that individuals reported few signs of mental distress in fear of losing their job, which could have reinforced the influence of social desirability rating. Taken together, these biases could influence rating at all time points and present an image of an above-average healthy sample that does not necessarily reflect the true presence of mental distress in the individuals. Critics of the hardiness literature have also claimed that hardy individuals simply *report* to be healthier than their lower hardy counterparts (Kobasa et al., 1982; Hull et al., 1987). More specifically, it has been suggested that hardy individuals experience the same degree of psychological distress as low hardy individuals but that reporting health problems does not reflect their belief in exerting control over their lives (Hull et al., 1987). Consequently, if subjects are ignorant to, or deny the presence of physical and/or psychological symptoms of distress, the measures of health will be poor indicators of actual health.

As implied in the above section, there are certain features of the present study that increase vulnerability for common method variance. Overall, despite the possibility of social desirability rating among participants and issues concerning self-report of internal states, the use of a prospective design eliminates other common method variances associated with self-report data collection. For instance, the present data is less affected by transient mood states. As indicated by its name, this refers to mood states that fluctuate based on circumstantial influences. More specifically it suggests that individual reports are influenced by subject mood state whilst responding to the questionnaire. Mood states are produced from a number of events, including receiving undesirable information from a co-worker, the death of a family member or simply having a “bad day” (Podsakoff et al., 2003). Using a prospective cohort study eliminates parts of this method variance as it captures individual reports under different circumstances and across time. Despite the strength of using a prospective design it is still difficult to provide general claims regarding the applicability of the proposed mediation model. One issue revolves around gender generalisability. Gender was excluded from the present analyses based on issues of confidentiality. This was likely due to the low

number of female participants and the enhanced opportunity for identifying these subjects if information about gender was given simultaneously to the remaining reports. The use of almost exclusively male samples is widely recognised as a criticism of the hardiness literature, and should accordingly be identified as a limitation of the present study. In arguing for hardiness as a generalised style of functioning, the specific features of the present study does not allow for inferences to be made about hardiness' influence on mental health through self-efficacy and worry in samples that differ substantially from the selected sample. This does not only concern gender, but other features such as different organisational settings, cultural differences, emotional/physical contexts, and so forth. The latter argument raises the question of specific environmental features and whether they can bias research findings.

Contextual influences. Johns (2006) argue that unexpected findings are often the result of failing to attend to contextual influences in doing research, whereby he stresses the importance of acknowledging possible effects of context both when designing research and interpreting results. Importantly, research that is directed at a specific occupational group increases the potential impact of contextual factors (Johns, 2006). The military context, as applied in the present study, is known to differ from civilian organisational settings in several manners (Hardinge, 1989; Krueger, 2001; Darr, 2011). The military organisation involves a great amount of carefully selected laws, regulations and policies, which provides clarity of the existing requirements and procedures (Darr, 2011). Moreover, Bradley (2006) described the central role of obedience in military contexts, and suggests that obedience is socially accepted as a core value in the military. To respond with obedience is a relatively common reaction to the hierarchical rank structure of the military organisation, where instructions are derived from personnel higher in the chain of command. Taken together, these bureaucratic features create an environment that is defined by higher situational strength when compared to other civilian organisational settings. The definition of high situational strength derives from Mischel' (1977) differentiation between strong and weak situations. The former are believed to place constraints on how individuals express personality differences, whereas weak situations are believed to provide an environment that is more susceptible for expressing individual differences. Specifically, strong situations are usually determined by explicit expectations to behave in a certain manner, thus leading individuals to engage in the behaviour deemed appropriate based on instructions. Moreover, it has been suggested that weak situations allow for individuals to rely more on their personality and intuitive thinking, when compared to behaviour in strong environments

(Darr, 2011). Situational strength is frequently discussed as moderator in examining the influence of individual differences (e.g. Murphy, 2005). For instance, Beaty, Cleveland, and Murphy (2001) investigated the relationship between job performance and personality, using the Five Factor Model of personality (Costa & McCrae, 1992), and found that the effect of personality was more powerful in the weak situation than in situations with higher strengths. In a study of work-life conflict in military personnel, Capon, Chernyshenko, and Stark (2007) found that their subjects were not more inclined to report dissatisfaction or intent to leave the organisation when they rated high work-life conflict, contrary to most research performed with personnel from civilian organisations. They interpreted this to mean that military personnel have a higher tolerance for work-life conflict, which may have resulted from organisational expectations about how to cope with stressors. Importantly, this suggests that coping with a stressful situation is based on organisational demands, and not personality characteristics. In other words, the context constrains the expression of personality. These findings suggest that personality-outcome relationships can be more difficult to detect in situations defined by high strength, which could entail that the expression of hardiness functioning is suppressed in the present sample. Although speculative, this also questions the relevance of looking to personality functioning in determining why some people appear to be more resilient in facing stressful situations. Importantly, future studies need to account for environmental context and isolate personality functioning in order to reliably suggest that personality, and not contextual features, is the source of successful adaptation. Military samples have shown to be particularly defined by participants with high hardy scores. For instance, military personnel undergo extensive training to qualify for deployment that could increase hardiness level. Similarly, it has been shown that hardiness is a useful predictor for successful completion of cadet training (Bartone, Roland, Picano, & Williams, 2008; Hystad, Eid, Laberg, & Bartone, 2011). Taken together this suggests that there could be a ceiling effect of hardiness in present sample, meaning that subjects score higher on hardiness altogether when compared to civilian organisational settings defined by lower levels of stress. Still, statistical analyses revealed that the mean hardiness score ($m = 2.6$) is not abnormal, thus ruling out potential ceiling effects. This provides support to a rejection of self-efficacy and worry as explanations for the hardiness-mental health association in the present sample.

Measurement of hardiness and mental distress. A careful examination of the present research findings need also consider strengths and limitations of the instruments used to measure hardiness and mental distress. Mental distress was measured with the 12-

item GHQ scale and the 25-item HSCL scale. An extensive amount of research has identified the 12-item GHQ as a reliable measure in comparing signs of psychological distress within and between populations, including occupational settings as applied in the present study (Banks et al., 1980; McCabe, Thomas, Brazier, & Coleman, 1996; Schmitz, Kruse, Heckrath, Alberti, & Tress, 1999). Similar results have been found for the 25-item HSCL (Lavik et al., 1999). Still, some research has argued that HSCL is a more rough measure of mental distress and is less suited for analysis of psychiatric disorders (Sandanger et al., 1998) and as a measure of specific impact of traumatising factors (Lavik et al., 1999). Still, according to Lavik and associates (1999) HSCL is useful in detecting other stressful variables, such as powerlessness and insecurity. Because the present study was aimed towards establishing psychological distress, and not psychiatric disorders per se, it is deemed suitable for the present study despite its limitations. Also, there were no reports of traumatic incidents during the operation. Taken together, the instruments used to measure mental health in the present sample appear well suited for analysis of the proposed mediation model and provides credibility to the study findings. On the other side, it is necessary to keep in mind the previously discussed possibility of mental distress being subjected to common method variance. Additionally, it is relevant to acknowledge that prior to deployment a licenced psychologist briefs the subjects on stress, coping, and mental preparedness, which in turn could have influence subject response. The enhanced focus on stress and mental health could have led participants to respond to the questionnaire based on the information given. More specifically, if motivation for participation is high they might wish to suppress any signs of psychological distress as it is deemed undesirable for the mission they are about to attend. A related concern involves the self-reported mental health issues in phase three as obtained in transit at end of deployment. It remains a possibility that late effects of operation participation is unacknowledged and that subjects can go on to develop symptoms of distress in the months following return from deployment. Consequently, these contextual features of the present study could mean that the measure of mental health distress provides an unrealistic image of participant's actual mental health state.

A thorough consideration of the applied measure need also attend to strengths and limitations of the applied hardiness scale. The hardiness literature has commonly been criticised for the use of different scales in measuring hardiness level (Hull et al., 1987). Fortunately, the research has paid considerable attention to this criticism and developed measures of hardiness that have rendered support for hardiness as an adequate measure of

resiliency (e.g. Hystad, et al., 2010). For instance, the Dispositional Resilience Scale (DRS) has been shown to be the best measure of hardiness (Funk, 1992). The Norwegian version of the DRS used in the present study is based on Bartone's (1995) short 15-item version (DRS-15), which has shown good stability over time (Hystad, Eid, Johnsen, Laberg, & Bartone, 2009). Nevertheless, a limitation of DRS is that it seems to only attend to hardiness in an organisational context that is concerned with work schedules and routine. If hardiness is to be a generalised style of functioning as originally proposed, and the DRS intends to measure hardiness across different situations, future development of the DRS should include elements that make it more reliable in measuring hardiness across different demographics. Bearing these acknowledgments in mind, it is reasonable to suggest that the DRS is an adequate measure of hardiness in the present study as it attends to a military organisational setting, however, it is difficult to generalise the findings. Another concern in hardiness research is whether hardiness should be measured as a unitary phenomenon or as independent contributions of challenge, control, and commitment. Still, the DRS allow the researcher to investigate both routes in predicting mental health outcome based on hardiness profiles. Thus, a possible explanation for the present findings is that the study did not apply hardiness in a manner that is consistent with current developments in hardiness research. This issue will be elaborated upon in the subsequent sections.

The foregoing discussion has highlighted some important features of the present study that could have biased the results. It is necessary to acknowledge that although the present study does not support the proposed mediation model, the findings could arguably be different in a study that used a separate sample and paid more consideration to methodological advancements in the hardiness research. The above discussion show that it can be challenging to reveal effects in samples that report good mental health. Moreover, it demonstrates that the findings could have been different had the situation been defined by higher degrees of stress. Nevertheless, the present findings give reason to discuss some of the main criticisms of the hardiness research and suggest ways to deal with these in future studies. The succeeding discussion will consider a prominent criticism of the hardiness literature, namely the dimensionality of the hardiness construct.

Theoretical implications

The unity of hardiness. A common debate in the hardiness literature is whether the hardiness construct should be considered a unitary phenomenon or as three separate phenomena associated with control, challenge, and commitment (Hull et al., 1987; Funk, 1992). Previous studies have attempted to establish an association between hardiness and

health outcome both using a Hardiness Index that includes all three dimensions (Kobasa et al., 1982; Manning, Williams, & Wolfe, 1988; Hystad et al., 2010), and independent effects of the challenge, control, and commitment dimensions (e.g. Ganellen & Blaney, 1984). The question of whether hardiness is unitary in its effects is ultimately empirical. As Hull and associates (1987), Funk (1992), and Carver (1989) has noted, it is not clear whether the difference usage is a consequence of the empirical failure of generalized hardiness to predict behaviour outcomes or conceptual confusion over the nature of the hardiness construct. Several studies have investigated the construct of hardiness with different findings. For instance, Funk and Houston (1987) conducted a factor analysis on five different scales that were used to measure hardiness in the early days of hardiness research, and found that the scales used to measure commitment loaded together on a single factor, while control and challenge scales loaded on a second factor in addition to loading on the commitment factor. Similarly, Hull and associates (1987) performed a factor analysis on all items from the six scales that were originally used to measure hardiness, and found that items used to measure control and challenge tended to load onto several factors, whereas the commitments items loaded together on a single factor. A second concern is the observed weak correlations between challenge and the two remaining dimensions, and that they appear to have independent values as predictors of health outcomes (Funk, 1992; Hystad, 2011). In a meta-analysis of the hardiness literature, Eschleman and associates (2010) found a strong association between commitment and control, but only moderate relationships between commitment-challenge, and control-challenge. Conclusively, they proposed that the exploratory analyses indicated that hardiness should be measured at the facet level. Nevertheless, related factor analyses have discovered a unitary factor and interpreted this as evidence of a general hardiness construct (Kobasa et al., 1982; Manning et al., 1988). A fairly recent study by Hystad and associates (Hystad et al., 2010) found support for a hierarchical structure that composed a general hardiness dimension with commitment, control, and challenge as correlated sub-dimensions. Their estimates indicated a general hardiness variable that accounted for more than two thirds of the variance accounted for by the model, and interpret this as a justification of a total hardiness score for future studies. Other studies have found theoretically significant effects using both approaches (Eid, Johnsen, Bartone, & Nissestad, 2008; Johnsen, Eid, Pallesen, Bartone, & Nissestad, 2009). The problem with using a total score of hardiness is that it may lead to unrealistic quantities of hardy individuals in empirical samples, as a combination of all three hardiness dimensions does not allow for inferences to be made about individuals' score on each of the

dimensions. For instance, a participant with high scores on control and challenge and a low score on commitment could still be counted as a hardy person in the sample, with similar patterns emerging for different combinations of hardiness dimensions.

Consistent with the most prominent studies in the field of hardiness research the present study analysed the association between hardiness and health by a composite measure of all three dimensions. Initial analysis of the data also revealed no support for the proposed model using independent measures of control, commitment, and challenge. This finding is inconsistent with studies that have emphasized transitioning from a consideration of hardiness as a unitary construct to regard mental health outcome as a result of independent influences of hardiness' three dimensions (Funk, 1992; Eschleman et al., 2010). However, it remains a possibility that the present study failed to attend to recent advancements in the hardiness literature.

To account for variance in individual scores on the three dimensions of hardiness, the current hardiness research has progressed into an identification of hardiness subgroups by using facet scores (Bartone, Valdes, Spinosa, & Robb, 2011; Johnsen, Hystad, Bartone, Laberg, & Eid, 2014). Johnsen and associates (2014) identified four hardiness profiles by using the Norwegian version of the DRS. Consistent with the original conceptualisation of hardiness subjects that reported high scores on all three dimensions of control, commitment and challenge were labelled as High Hardy profiles. Similarly, low scores on all three facets led to a Low Hardy profile. The main interest derived from this study is the development of two novel hardiness profiles: Hardy Sensation Seeking and Hardy Rigid Control. The Sensation Seeking profile emerged from low scores on commitment and control, and high scores on challenge. The challenge dimension of hardiness therefore appear to overlap with the construct of Sensations Seeking, which has been previously characterised as a personality trait with biological correlates that favour a need for psychological arousal (Stephenson, Hoyle, Palmgreen, & Slater, 2003). Nevertheless, Johnsen and associates (2013) still found that hardiness predicted successful completion of a physically demanding task when controlling for the conceptually different term 'sensation seeking'. Again, the commitment dimension emerged as the strongest predictor of success (Johnsen et al., 2013). The fourth profile that emerged from Johnsen and associates' (2014) study was high scores on control and commitment with low scores on challenge, labelled as Rigid Control. This profile aligns with findings from Sandvik and colleagues (2013) that observed the presence of two hardiness subgroups, the unbalanced and the balanced group. Rigid Control inhabits the same characteristics as the unbalanced group. In addition to defining clusters of

hardiness profiles, Johnsen and colleagues (2014) investigated the effect of each profile on health outcome. The study found that subjects with a Rigid Control profile reported higher scores on GHQ than the three remaining clusters, and suggested that this was due to subjects preference for familiar situations as indicated by their low score on the challenge dimension. As known, subjects that report low scores on challenge perceive change as threatening rather than as an opportunity for growth and development. In turn, this could lead to higher degrees of worry and reports of mental distress. Thus, future studies that wish to investigate the influence of hardiness on worry could incorporate the Rigid Control profile.

The above section presents interesting developments in the field of hardiness research. A natural response in explaining the present findings is to argue that it failed to conduct analyses on the recent proposed association between health outcome and different subgroups of hardiness. Perhaps a more careful consideration of different hardiness profiles would have yielded different findings. Certainly, a psychological science that aims to pursue the true underlying mechanisms of hardiness as a pathway to resilience should include new discoveries in order to secure a realistic image of the influence of personality differences. Nevertheless, the present research findings highlight the importance of attending to dimensionality concerns. Had the current findings derived from analyses on the novel hardiness profiles, it would offer less reflection regarding previous studies that have failed to use suitable methodology for investigating mediation effect using a total hardiness score or independent measures of control, commitment, and challenge. Importantly, because no studies have investigated self-efficacy and worry as mediator variables in the hardiness-mental health association, it was deemed reasonable to apply the original measure of hardiness.

The remainder of the discussion it will attempt to position hardiness in a wider context and discuss some final criticisms of the hardiness literature and provide suggestions for future studies. A common feature of scientific research is the publication of meta-analyses. As evident from the foregoing text, the present study has based its arguments and discussion on the prominent theoretical framework surrounding the concept of hardiness and its relationship with mental health. However, there are a number of issues that can emerge in solely relying on the most applicable research and the meta-analysis that examine effects by summarising the results found in such studies.

Attending to the past for a future of hardiness research. Hull and associates (1986), Funk (1992), and Eschleman and colleagues (2010) have offered meta-analyses of the hardiness literature and contended that hardiness is a valuable predictor of health

outcome. Nevertheless, there are elements of these studies that require attention. A close examination of the studies applied in these studies reveals important limitations. For instance, these meta-analyses are based on studies that vary in use of methodology and theory, with a vast majority of the studies having used male samples and cross-sectional data collection. Additionally, many of these studies attempted to examine mediator variables but failed to use to correct methodology to do so. Therefore, these studies may infer a relationship between hardiness and health that does not necessarily reflect reality. Moreover, Eschleman and associates (2010) fail to attend to critical questions regarding the context of hardiness functioning, such as how and when hardiness should be used as a measure of resiliency. It is important that future studies attend to the question of context in examining effects of hardiness on mental health. This should be done in an attempt to generalise the use of hardiness as pathway to resiliency. A second problem with meta-analyses is that they develop under the assumption that all relevant studies are available for analysis, at least the most representative ones (Sterling, Rosenbaum, & Weinkam, 1995). This does not necessarily provide an accurate reflection of hardiness functioning. Accessing research findings usually imply searching through published studies. As with most published findings in psychological research meta-analyses of hardiness as a route to resilience could be subject to publication bias. This refers to a phenomenon whereby scientific journals favour studies that report effects that, on statistical evaluation, have a low probability of incorrectly rejecting the null-hypothesis (Sterling et al., 1995). Already in the late fifties, Sterling (1959) reported that major psychology journals showed reluctance in publishing negative results, in which he observed that approximately 97% of published findings were based on statistically significant effects. Unfortunately, publication bias is still considered a problem for psychological science as highlighted by a number of researchers since the late fifties (e.g. Begg & Berlin, 1988; Begg & Mazumdar, 1994; Sterling et al., 1995; Ferguson & Brannick, 2012; Aarts et al., 2015). The future of psychological research, including hardiness research, should therefore aim to publish all inconclusive findings, because only then will psychology have a realistic opportunity for revealing the objective truth, given that there exists one. Surely, if the mentioned meta-analyses for hardiness research have been subjected to publication bias this could suggest that they provide an unrealistic image of hardiness' influence on mental health outcome. More importantly, since a great deal of the studies have indeed yielded inconclusive findings this provide further support that hardiness is less relevant as a measurement of resiliency than some researchers might suggest. Importantly, if the last fifty years of hardiness research has been affected by publication bias there might be

an overwhelming load of evidence that could support the present findings, which has never been published and included in these meta-analyses. While it is interesting to speculate about the history of hardiness research it is necessary to keep in mind that an extensive amount of research has in fact been able to provide reliable suggestions that hardiness is a valuable predictor of mental health outcome. Moreover, it is inadequate to dismiss a substantial volume of scientific findings merely based on the results from one empirical study.

Conclusion

The present study set out to examine the relationship between hardiness and mental health and was unable to suggest that hardy personality functioning indirectly influences mental health through self-efficacy and worry. The applied procedure for data collection and the obtained results highlights the importance of attending to recent advancements in the field of hardiness research, in addition to underlining the necessity of approaching mediation analyses in an appropriate manner. The foregoing discussion has presented important strengths and limitations to the present study and directions for future research on hardiness as a pathway to resiliency. Particular credibility of research findings was achieved using a prospective cohort design that obtained individual reports on the selected variables at three stages of deployment. However, as presented there are a number of key characteristics of the present sample that makes it difficult to reject the proposed mediation model in the current sample, as well as generalising a rejection in other samples. Importantly, future research should increasingly question when hardiness exerts its most powerful effect whereby a distinction between high-stress and low-stress situations is in order. In regard to the proposed model future studies should aim to differentiate between pathological and non-pathological worry, in addition to further explore how self-efficacy and hardiness differ in how they exert positive effects on mental health outcomes. The discussion has provided information about interesting advancements in the use of hardiness profiles and future studies should aim to incorporate these in their attempt to broaden the understanding of hardiness functioning. Finally, future studies should strive to apply the same methods for investigating mediator variables in order to reliably establish the routes through which hardiness exerts its effect on mental health.

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Appendix

Scales and measures of the applied variables

The Dispositional Resilience Scale (DRS-15)

(DRS-15; Bartone, 1995; Hystad, Eid, Johnsen, Laberg, & Bartone, 2010)

(R) viser til spørsmål som ble reversert til bruk i analysene.

Nedenfor følger noen påstander om livet, som folk vil oppfatte ulikt. Vennligst indiker i hvor stor grad du synes hver påstand stemmer. Gi uttrykk for din oppriktige mening. Det er ingen rette eller gale svar.

1. **Mesteparten av mitt liv blir brukt til å gjøre ting som er meningsfulle.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
2. **Ved å arbeide hardt kan du nesten alltid nå dine mål.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
3. **Jeg liker ikke å gjøre endringer i mine vanlige aktiviteter. (R)**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
4. **Jeg føler at livet mitt er ganske innholdsløst. (R)**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
5. **Endringer i rutinene er interessante for meg.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
6. **Hvordan det går med meg i livet avhenger av mine egne handlinger.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
7. **Jeg er virkelig frem til arbeidet mitt.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
8. **Jeg tror ikke det er mye jeg kan gjøre for å påvirke fremtiden min. (R)**

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

9. **Det er opp til meg å avgjøre hvordan resten av livet mitt skal bli.**

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

10. **Livet er generelt kjedelig for meg. (R)**

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

11. **Det plager meg når jeg blir forstyrret i mine daglige gjøremål. (R)**

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

12. **De fleste dager er livet virkelig interessant og givende for meg.**

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

13. **Jeg trives med utfordringen når jeg må gjøre mer enn en ting om gangen.**

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

14. **Jeg liker å ha en daglig rutine som ikke endrer seg så mye. (R)**

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

15. **Mine valg spiller en stor rolle for hvordan ting ender opp.**

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

Ferdigheter (Military skills and abilities)

(Solberg, 1997)

I en skarp situasjon stilles det særlige krav til den enkelte. På de neste sidene finner du utsagn om egenskaper som kan være av betydning for å mestres en skarp situasjon. For hvert utsagn skal du svare ved å sette kryss ved det tallet som passer best for deg. Svarene angis på en skal fra 1 ("svært svake") til 5 ("svært gode") som du skal bruke til å markere hvordan du vurderer dine egne evner og egenskaper. Alternativ 0 er "vet ikke".

1. **Jeg opplever at mine sjømilitære ferdigheter i tjenestestillingen(e) om bord er:**
 Svært svak Svak Middels God Svært god Vet ikke

2. **Jeg opplever at min evne til å takle stress er:**
 Svært svak Svak Middels God Svært god Vet ikke

3. **Jeg opplever at min vilje til å handle etter ordre i faresituasjoner er:**
 Svært svak Svak Middels God Svært god Vet ikke

4. **Jeg opplever at min evne til å snakke om følelser etter sterke opplevelser er:**
 Svært svak Svak Middels God Svært god Vet ikke

5. **Jeg opplever at min evne til å "holde hodet kaldt" i vanskelige situasjoner er:**
 Svært svak Svak Middels God Svært god Vet ikke

6. **Jeg opplever at min fysiske kapasitet/utholdenhet er:**
 Svært svak Svak Middels God Svært god Vet ikke

7. **Jeg opplever at min evne til å handle selv om jeg føler meg truet er:**
 Svært svak Svak Middels God Svært god Vet ikke

8. **Jeg opplever min evne til å gi klare og tydelige ordrer i pressede situasjoner er:**
 Svært svak Svak Middels God Svært god Vet ikke

9. **Jeg opplever at min evne til å bedømme andres yteevne i pressede situasjoner er:**
 Svært svak Svak Middels God Svært god Vet ikke
10. **Jeg opplever at min evne til å ta beslutninger i vanskelige situasjoner er:**
 Svært svak Svak Middels God Svært god Vet ikke
11. **Jeg opplever at min evne til å utføre oppgaver selv om forholdene er kaotiske/ute av kontroll er:**
 Svært svak Svak Middels God Svært god Vet ikke
12. **Jeg opplever at min evne til å samarbeide i vanskelige situasjoner er:**
 Svært svak Svak Middels God Svært god Vet ikke
13. **Jeg opplever at min evne til å gi støtte til andre i krevende situasjoner er:**
 Svært svak Svak Middels God Svært god Vet ikke
14. **Jeg opplever at min evne til å ta ledelsen når det oppstår vanskeligheter er:**
 Svært svak Svak Middels God Svært god Vet ikke
15. **Jeg opplever at min evne til å motivere og inspirere andre under vanskelige forhold er:**
 Svært svak Svak Middels God Svært god Vet ikke
16. **Jeg opplever at min evne til å raskt å oppfatte faresignaler er:**
 Svært svak Svak Middels God Svært god Vet ikke
17. **Jeg opplever at min vilje til å delta i fredsbevarende operasjoner er:**
 Svært svak Svak Middels God Svært god Vet ikke
18. **Jeg opplever at min vilje til å delta i fredsopprettende operasjoner er:**
 Svært svak Svak Middels God Svært god Vet ikke
19. **Jeg opplever at min innstilling til å forsvare Norge ved en eventuell krig er:**

Svært svak Svak Middels God Svært god Vet ikke

20. Jeg opplever at min evne til å løse oppdraget totalt sett er:

Svært svak Svak Middels God Svært god Vet ikke

Din aktuelle livssituasjon (Bekymringer)

(Johnsen, Eid, Birkhaug, Sommerfelt-Pettersen, & Koefoed, 2007)

(R) viser til spørsmål som ble reversert til bruk i analysene.

Også forhold utenfor tjenesten kan påvirke motivasjon og operativitet. Nedenfor finner du noen forhold som kan tenkes å påvirke operativitet under internasjonal tjeneste. Svar ved å sette kryss ved det tallet som passer best for deg.

1. I hvor stor grad bekymrer du deg over forhold hjemme?

Svært liten grad (1) 2 3 4 Svært mye (5)

2. I hvor stor grad var familien forberedt på at du dro ut på oppdraget? (R)

Svært liten grad (1) 2 3 4 Svært mye (5)

3. I hvor stor grad føler du at de hjemme støtter deg under oppdraget? (R)

Svært liten grad (1) 2 3 4 Svært mye (5)

4. I hvor stor grad savner du familie og venner i Norge?

Svært liten grad (1) 2 3 4 Svært mye (5)

Generell Helse (GHQ-12)

(Goldberg & Hillier, 1979)

Vi vil gjerne vite hvordan din helse har vært de siste par ukene. Vær vennlig å besvare alle spørsmålene ved å sette kryss for det svaralternativet som best beskriver din opplevelse av egen helse.

1. Har du i løpet av de siste par ukene vært i stand til å konsentrere deg fullt ut om alt du har gjort?

Ikke i det hele tatt Ikke mer enn vanlig Noe mer enn vanlig Mye mer enn vanlig

2. Har du i løpet av de siste par ukene ligget våken på grunn av bekymringer?

Ikke i det hele tatt Ikke mer enn vanlig Noe mer enn vanlig Mye mer enn vanlig

3. Har du i løpet av de siste par ukene følt at du tar del i ting på en nyttig måte?

Ikke i det hele tatt Ikke mer enn vanlig Noe mer enn vanlig Mye mer enn vanlig

4. Har du i løpet av de siste par ukene følt at du er i stand til å ta bestemmelser?

Ikke i det hele tatt Ikke mer enn vanlig Noe mer enn vanlig Mye mer enn vanlig

5. Har du i løpet av de siste par ukene stadig følt deg utsatt for press?

Ikke i det hele tatt Ikke mer enn vanlig Noe mer enn vanlig Mye mer enn vanlig

6. Har du i løpet av de siste par ukene følt deg ute av stand til å mestre dine vanskeligheter?

Ikke i det hele tatt Ikke mer enn vanlig Noe mer enn vanlig Mye mer enn vanlig

7. Har du i løpet av de siste par ukene vært i stand til å glede deg over dine daglige gjøremål?

Ikke i det hele tatt Ikke mer enn vanlig Noe mer enn vanlig Mye mer enn vanlig

8. Har du i løpet av de siste par ukene vært i stand til å håndtere dine problemer?

Ikke i det hele tatt Ikke mer enn vanlig Noe mer enn vanlig Mye mer enn vanlig

9. Har du i løpet av de siste par ukene følt deg ulykkelig og nedtrykt (deprimert)?

Ikke i det hele tatt Ikke mer enn vanlig Noe mer enn vanlig Mye mer enn vanlig

10. Har du i løpet av de siste par ukene mistet selvtillit?

Ikke i det hele tatt Ikke mer enn vanlig Noe mer enn vanlig Mye mer enn vanlig

11. Har du i løpet av de siste par ukene tenkt på deg selv som en verdiløs person?

Ikke i det hele tatt Ikke mer enn vanlig Noe mer enn vanlig Mye mer enn vanlig

12. Har du i løpet av de siste par ukene stort sett følt deg tilfreds, når alt tas i betraktning?

Ikke i det hele tatt Ikke mer enn vanlig Noe mer enn vanlig Mye mer enn vanlig

Hopkins Symptom Checklist (HSCL-25)

(Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974; Hesbacher, Rickels, Morris, Newman, & Rosenfeld, 1980; Nettelbladt, Hansson, Stefansson, Borgquist, & Nordstrøm, 1993)

Vurder hvor mye hvert symptom har vært en plage eller ulempe for deg de siste to ukene.

1. Plutselig skremt uten grunn.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

2. Føler deg engstelig.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

3. Føler deg svimmel eller kraftløs.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

4. Nervøs eller urolig.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

5. Hjerterbank.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

6. Skjelving.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

7. Følelser som lett svinger opp og ned.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

8. Føler deg anspent eller opphisset.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

9. Anfall av redsel eller panikk.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

10. **Rastløshet, kan ikke sitte stille.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
11. **Føler deg slapp uten energi.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
12. **Anklager deg selv for ting.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
13. **Har lett for å gråte.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
14. **Tap av seksuell interesse/opplevelse.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
15. **Dårlig appetitt.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
16. **Vanskelig for å sove.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
17. **Følelse av håpløshet med hensyn til fremtiden.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
18. **Føler deg nedfor.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
19. **Føler deg ensom.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
20. **Har tanker om å ta ditt eget liv.**
 Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig
21. **Følelse av å være fanget.**

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

22. Bekymrer deg for mye.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

23. Føler ikke interesse for noe.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

24. Føler at alt krever en stor anstrengelse.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig

25. Føler at du ikke er noe verd.

Slett ikke riktig Litt riktig Ganske riktig Fullstendig riktig