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The Protective Effects of Perceived Partner Responsiveness on Service Members' Drinking and Health Outcomes

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by

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Abstract

Stress is a known predictor of various adverse health behaviors and outcomes, such as poorer physical health, injuries, and mental well-being (Bedno et al., 2014; Hsieh & Tsai., 2019; Teh et al., 2015). Specifically, stressful events, including minor daily hassles, as well as major life changes and pressures that are perceived negatively, can lead to experiences of psychological distress (Harkness & Monroe, 2016). Psychological distress is commonly defined as symptoms of anxiety and depression, including worry, sadness, and hopelessness (Kessler et al., 2002). These concerns are particularly acute for military families, who experience a unique set of stressors and loneliness due to deployments and separation, long shifts, and frequent relocations (Russo & Fallon, 2015). Those experiencing psychological dFreistress are also more likely to engage in heavy or binge drinking and increase their typical alcohol consumption (Bozic et al., 2022; Choi & Dinitto, 2011; Lewis Brown & Richman, 2012; Pape & Nortsröm, 2016; Verplaetse et al., 2021). Moreover, alcohol use problems in military employees have been linked to poorer overall physical health, job, and social functioning (Mattiko et al., 2011; Stahre et al., 2009; Waller et al., 2015). The present study examined how interpersonal relationship factors can protect partnered military employees from the negative health consequences of distress.

One interpersonal factor that may have protective effects over distress is perceived partner responsiveness (PPR; Reis & Shaver, 1988). PPR refers to the extent to which one feels understood, validated, and cared for by their partner. Researchers have

described PPR as a critical mechanism through which partners can impact each other's health behaviors and outcomes (e.g., Farrell et al., 2023). Previous literature has linked PPR to increased longevity, well-being, and certain health behaviors, namely decreased smoking and improved sleep (Alonso-Ferres et al., 2020; O'Neill et al., 2020; Selcuk & Ong, 2013; Selcuk et al., 2016; Selcuk et al., 2017; Stanton et al., 2019). PPR can protect people from the adverse health outcomes of stress and uncertainty, similar to how social support buffers against the negative effects of stress (Cohen & Wills, 1985). However, less is known about the potential buffering effects of PPR, which the current paper aimed to address.

The present study examined the influence of PPR on the relationship between psychological distress and health outcomes, including problematic drinking and perceived health in a sample of full-time military employees. A secondary data analysis was conducted with a sample (N = 704) from the Military Employee Sleep and Health (MESH) intervention for the U.S. National Guard (NG) service members. The participants were full-time NG employees who completed baseline, 4-month, and 9-month follow-up surveys assessing their levels of psychological distress, PPR, alcohol use disorder symptoms, and overall perceived health.

Psychological distress at baseline was hypothesized to predict higher levels of alcohol consumption (H1a) and poorer perceived health (H1b) at the 9-month follow-up. PPR at baseline was also hypothesized to predict lower levels of alcohol consumption (H2a) and better perceived health (H2b) at the 9-month follow-up. Moreover, PPR was predicted to moderate the relationship between psychological distress, alcohol consumption (H3a), and perceived health (H3b). Specifically, participants who reported

high levels of PPR were expected to be less impacted by the experiences of distress than those who report lower levels of PPR. The results indicated that both distress and PPR were significant predictors of perceived health at nine months. The models with alcohol use as an outcome nor moderation hypotheses were supported by the current findings. Knowing which aspects of interpersonal relationships impact health outcomes can further help the field in advancing couple- and family-based interventions.

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Introduction

Psychological distress, defined as symptoms of depression and anxiety, is a known predictor of a variety of adverse health outcomes, such as poorer physical health, increased chance of injuries, and poorer mental well-being (Bedno et al., 2014; Cohen & Wills, 1985; Hsieh & Tsai., 2019; Teh et al., 2015). These concerns are particularly acute for military families who experience a unique set of stressors and loneliness due to deployments and separation, long shifts, and frequent relocations (Russo & Fallon, 2015). Indeed, work-related stress in the military is a significant contributor to emotional distress in service members (Pflanz et al., 2002).

Psychological distress, negative appraisal of stressors, and posttraumatic stress symptoms, common among service members, have been associated with problematic alcohol use (McCabe et al., 2019; Mohr et al., 2018). Heavy drinking, typically defined as consuming five or more drinks on one occasion, has been linked to alcohol use problems among military employees, such as poorer overall physical health, job, and social functioning (Mattiko et al., 2011; Stahre et al., 2009; Waller et al., 2015). Moreover, research in the field indicates that experiences of distress and alcohol use do not decrease after service members leave the military, highlighting the pervasiveness of these issues (Derefinko et al., 2018). Considering the lasting effects of distress and drinking problems, especially in demanding work environments such as the military, examining how protective factors can negate the harmful effects of these stressors is crucial. One such protective factor is social support, as it is often offered and received from family, friends, and coworkers on a daily basis.

Psychological Distress

First, it is essential to understand the literature and theory on stress, stress appraisal, and the experience of psychological distress. Lazarus and Folkman (1984) introduced the transactional model of stress and examined the cognitive appraisal of stress more closely. The primary appraisal process is the evaluation of whether an event is relevant, positive, or stressful (Lazarus & Folkman, 1984). If a stressor is perceived, a secondary appraisal will take place, during which one must determine if they have sufficient resources to cope with the stressor and if anything can be done about it (Lazarus & Folkman, 1984).

Not all stress is harmful, and researchers have aimed to further clarify the distinction between stress and distress. Harkness and Monroe (2016) made a distinction between stressful events, daily hassles, and stress responses. Perceiving these stressful events as unfavorable is what can lead to an adverse stress response or psychological distress (Harkness & Monroe, 2016). Psychological distress is often defined as symptoms of mental health disorders, typically symptoms of anxiety and depression, to the extent that one could be diagnosed with a clinical diagnosis and is often evaluated in research using the K6 or K10 measures (Kessler et al., 2002). The negative stress response, distress, is what bidirectionally impacts illness outcomes, though many third variables, such as personality, environmental, and neurobiological factors, impact how stress is reacted to (Harkness & Monroe, 2016). Additionally, when one experiences more stressors, they are more likely to react in a distressed manner (Harkness & Monroe, 2016). The present study focuses on psychological distress specifically, as it is argued to

be the connection between stressful events and health and directly linked to adverse health outcomes.

Military personnel are known to be at risk for psychological distress due to the nature of the work - deployments, combat exposure, and risk of physical injury. However, Pflanz and Sonnek (2002) argued that even the day-to-day operations of military employees put them at risk for work stress and, ultimately, psychological distress. Indeed, a survey of active-duty Air Force personnel stationed in the United States revealed that almost a quarter of the participants reported significant work stress, and 15% of the soldiers believed this work-related stress to be the main cause of their emotional distress (Pflanz & Sonnek, 2002). Moreover, Pflanz and Sonnek (2002) concluded these statistics to be higher than those of the general public, highlighting the importance of examining distress-mitigating factors in military populations.

Beyond distress, the prevalence of mental health disorders in the National Guard has been of interest to researchers. Gorman and colleagues (2011) found that 40% of National Guard service members qualified for at least one mental health diagnosis. In their sample, 11% of the National Guard service members reported significant levels of PTSD symptoms, 21% reported depression symptoms, and 20% reported hazardous alcohol use (Gorman et al., 2011). These findings were replicated by Valenstein and colleagues (2014) who found that 21% of their National Guard service members sample reported depression. One of the reasons why mental health symptoms and distress can be especially harmful in the military is barrier to treatment. Indeed, Valenstein and colleagues (2014) found that almost half of their National Guard sample perceived barriers to mental health treatment, and 34% believed mental health stigma to be a large

reason as to why they hesitated to get help. Many participants expressed that they did not want mental health issues to be reflects on their military record (Valenstein et al., 2014). Beyond treatment barriers, the National Guard service members experience unique struggles in comparison to other military units. Ormeno and colleagues (2020) reported that National Guard members may struggle with feeling disengaged from the military community (especially if living off base) but at the same time experience challenges with integration into civilian communities. To summarize, the National Guard is a unique part of the military, suspectable to psychological distress symptoms, a topic worthy of further exploration in this population.

Psychological Distress and Drinking

As Harkness and Monroe (2016) concluded, psychological distress has been linked to a variety of adverse health behaviors and outcomes. Previous literature has examined the relationship between psychological distress and drinking outcomes from adolescents to older adults. Pape and Nortström (2016) examined emotional distress, defined as symptoms of anxiety and distress, and heavy episodic drinking, defined as drinking to intoxication, in a longitudinal study from adolescence to early adulthood. The results indicated that emotional distress was a significant predictor of heavy episodic drinking in the transition from adolescence to early adulthood (Pape & Nortström, 2016). Bozic and colleagues (2022) examined binge drinking (five more drinks on one occasion at least once in the last year), long-term risky drinking (at least 730 drinks in the past year), and psychological distress in a sample of 14 to 99-year-olds. Similarly to the previous findings, Bozic and colleagues (2022) found that poor and severe psychological

distress both predicted binge drinking and long-term risky drinking. The risk was higher for females with severe psychological distress living in non-urban areas, though males living further away from urban environments were also at an increased risk for binge drinking (Bozic et al., 2022).

Beyond the direct effects of distress on drinking, researchers have also investigated whether drinking may be a coping mechanism to deal with stressors. Lewis Brown and Richman (2012) investigated the effects of economic stressors on psychological distress and consequently on past month drinking and problem drinking. Past month drinking was measured in the average number of days participants consumed alcohol and the average number of drinks consumed (Lewis Brown & Richman, 2012). Problem drinking was measured using the Brief Michigan Alcoholism Screening Test, which is used to detect alcohol dependence (Lewis Brown & Richman, 2012). Psychological distress was measured in terms of symptoms of anxiety and depression (Lewis Brown & Richman, 2012). Lewis Brown and Richman (2012) found that psychological distress partially mediated the relationship between economic stressors and alcohol outcomes. The findings imply that people may have used drinking as a coping mechanism in the face of distress.

Psychological Distress and Perceived Health

Beyond health behaviors, psychological distress has also been examined in relation to broader health outcomes, such as perceived health. Perceived health has been described as the subjective way in which one views one's own physical health and well-being, separate from objective measures of health (Farmer & Ferraro, 1997). Importantly,

perceived health has been found to be a significant predictor of future health problems, such as disability and mortality (Ferraro et al., 1997; Idler & Angel, 1990; Idler & Kasl, 1991; Idler & Kasl, 1995; Mor et al., 1989; Wilcox et al., 1996; Wolinsky & Johnson, 1992, as cited in Farmer & Ferraro, 1997). Ferraro and colleagues (1997) identified two ways in which perceived health may impact subsequent health outcomes: awareness of preliminary health issues and trait optimism or pessimism. Having an awareness of your current health status can help identify future health issues as they come up. In addition to awareness, perceptions of health can be impacted by trait optimism and pessimism, which can further affect health outcomes (Ferraro et al., 1997).

Farmer and Ferraro (1997) define distress as stress that is perceived negatively or given a negative value. The authors aimed to determine if distress impacts perceived health over ten years and if perceived health predicts morbidity independently from distress (Farmer & Ferraro, 1997). Distress was measured using two questions relating to feelings of stress, strain, pressure, and feelings of anxiety, worry, and sadness (Farmer & Ferraro, 1997). The results indicated that distress predicted poor perceived health over time and vice versa, indicating that the relationships between distress and health may be bidirectional (Farmer & Ferrara, 1997). When distress was not considered, perceived health predicted changes in morbidity and functional disability, but when distress was controlled for, perceived health only predicted changes in functional disability (Farmer & Ferrara, 1997). The results further highlight the long-term consequences of psychological distress on health and morbidity.

Koompans and Lamers (2005) examined the relationship between physical illness and health as well as psychological distress in a sample of Dutch adults. The authors

defined psychological distress as symptoms of depression, negative affect, and nervousness (Koompans & Lamers, 2005). Koompans and Lamers (2005) found that all three aspects of psychological distress were related to subjective health. However, when the physical illness was controlled for, the link between depressive symptoms and subjective health was impacted the least (Koompans & Lamers, 2005). The results indicate that psychological distress is closely tied to perceived health, which is related to physical illness, and that symptoms of depression may be least impacted by physical illness.

Tessler and Mechanic (1978) used four separate datasets to examine psychological distress and its relationship to perceived health in adults in the United States. Symptoms of depression, negative affect, and anxiety were used to measure psychological distress (Tessler & Mechanic, 1978). As Tessler and Mechanic (1978) predicted, all measures of psychological distress correlated with perceived physical health. In regression analyses, poorer perceived health was predicted by negative affect, lack of happiness, and nervousness (Tessler & Mechanic, 1978). The results highlight how psychological distress can be an antecedent of physical health status.

Schmitz and colleagues (2009) examined how health status impacts psychological distress measurement in a general population sample of Canadians. Psychological distress was assessed using the K6 and K10 measures, which identify symptoms of depression and anxiety (Kessler et al. 2002). The researchers found that for participants who reported poor perceived health, the cut-off points for psychological distress were also higher than for participants who were in better health (Schmitz et al., 2009). Both the K6 and K10 psychological distress measures performed similarly in detecting distress for

participants with similar health levels (Schmitz et al., 2009). Those with good health and lower psychological distress scores were more likely to have psychiatric disorders than subjects with worse perceived health (Schmitz et al., 2009). Schmitz and colleagues (2009) concluded that both K6 and K10 measures are good at detecting psychological distress and that physical health should be taken into account when examining distress.

Perceived Partner Responsiveness

Perceived partner responsiveness (PPR), how well one feels understood, validated, and cared for by their partner (Reis & Shaver, 1988), has been of interest in the field of close relationships and health. According to Reis and Shaver (1988), PPR is a part of the discourse between partners, during which a partner self-discloses to their spouse, and the spouse responds to the disclosure. After the interaction, the partner is left feeling understood, validated, and cared for by their spouse if the spouse is perceived as responsive (Reis & Shaver, 1988). More recently, high-quality listening has been described as one of the critical ingredients to partner responsiveness (Itzchakov et al., 2022). In order to engage in high-quality listening, one must show attention, comprehension, and positive intention toward their conversation partner (Itzchakov et al., 2022). A related concept, capitalization, refers to a partner sharing good news with their loved one (Gable et al., 2004). This retelling of the positive news and the feeling that in response, one's partner understands, validates, and cares for you, can increase positive emotions and well-being beyond the event itself (Gable et al., 2004). It comes as no surprise that responsiveness is one of the main ingredients of a good quality relationship (Canevello & Crocker, 2010).

Slatcher and Selcuk (2017) hypothesized how strengths and strains in marriages can impact married couples' individual health outcomes, as seen in Figure 1. Marital strengths, such as partner responsiveness, can directly influence health behaviors such as sleep and substance use while also buffering against the effects of stressors on these health outcomes (Slatcher & Selcuk, 2017). According to the Strength and Strain Model, these health behaviors, affect, and psychological mechanisms over time can impact biological pathways and long-term physical health outcomes, such as mortality (Slatcher & Selcuk, 2017). The Strength and Strain Model highlights the importance of investigating interpersonal interactions and their effects on the health and well-being of individuals (Slatcher & Selcuk, 2017). One of these marital strengths is perceived partner

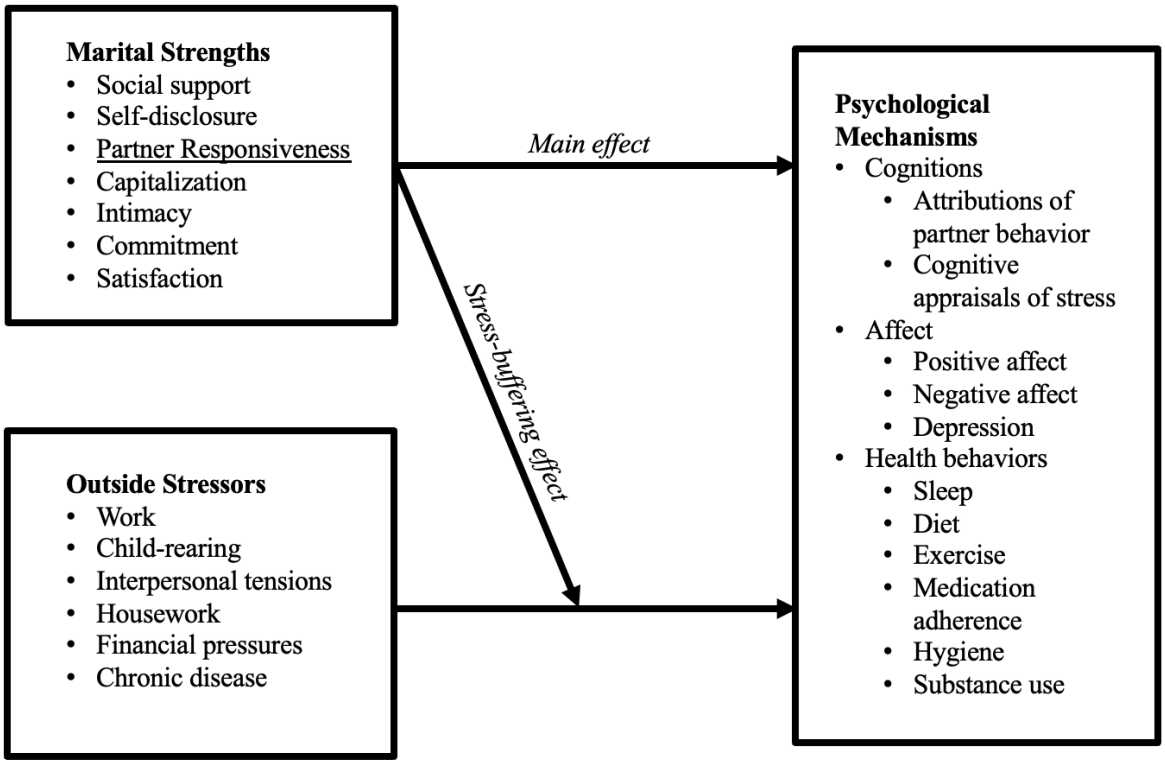

Figure 1 - *The Strength and Strain Model of Marital Quality and Physical Relationship (adapted from Slatcher & Selcuk, 2017)*

responsiveness - a key ingredient for good quality relationships (Canevello & Crocker, 2010). In summary, PPR has been hypothesized to directly predict positive health outcomes in couples, and also indirectly buffer against the negative consequences of distress on health (Slatcher & Selcuk, 2017).

Health Benefits of Perceived Partner Responsiveness

Recent literature has explored the mechanisms through which PPR is connected to better health behaviors and outcomes for partners. Slatcher and Selcuk (2017) hypothesized that PPR can be directly linked to better health outcomes and also act as a negativity buffer, protecting one from the harmful effects of stressors, such as work stress, interpersonal issues, and financial concerns. Farrell and colleagues (2023) added that responsiveness may positively impact physical health outcomes via a lower stress response, better immune functioning, and the creation of healthy habits. Steeper cortisol declines during the day, which may be one function through which those with responsive partners may stay healthier over time (Farrell et al., 2023).

One of the health behaviors impacted by PPR is sleep - a known predictor of perceived health (Dalmases et al., 2019). Sleep in couples is considered a dyadic activity in which both members of the couple can impact each other's sleep outcomes (Selcuk et al., 2017). Selcuk and colleagues (2017) examined PPR and sleep outcomes in married and cohabitating adults in the U.S. over approximately two years. The researchers found that participants who perceived their partner as more responsive were also experiencing fewer sleep problems (Selcuk et al., 2017). This relationship between PPR and sleep was mediated via reduced anxiety and depression symptoms (Selcuk et al., 2017). The results

highlight how higher rates of PPR can positively impact sleep outcomes through symptoms related to psychological distress, such as reduced depression and anxiety.

Beyond sleep, studies have explored the effect of PPR on substance use behaviors, such as smoking and drinking. Britton and colleagues (2019) examined PPR and smoking cessation in couples motivated to quit cigarettes over a month. Data gathered focused on the partner attempting to quit, who had quit smoking 12 hours before their first appointment (Britton et al., 2019). Over and above support for quitting and relationship satisfaction, PPR predicted better smoking cessation outcomes at the follow-up, specifically the frequency and quantity of smoking. (Britton et al., 2019). These results indicate that quitters who felt that their partners were responsive smoked less at follow-up than those participants who did not perceive their partners as responsive (Britton et al., 2019). These findings provide support for the hypothesis that PPR can positively impact health habits, such as other substance use behaviors like drinking.

Partner responsiveness has also been examined in relation to drinking and drinking motives. Mohr and colleagues (2016) examined capitalization, the sharing of positive news with one's partner, together with drinking quantity and drinking motives in undergraduate students. The results indicated that for partnered participants, having a responsive partner to capitalization attempts was linked to more drinks consumed in the past 30 days via enhancement drinking motives (Mohr et al., 2016). The findings imply that having a highly responsive partner can lead to increased drinking via celebration of good news (Mohr et al., 2016). Though capitalization and PPR are related concepts, capitalization refers to the positive experiences of sharing and celebrating good news (Gable et al., 2004). PPR, on the other hand, refers to an understanding, validating, and

caring partner (Reis & Shaver, 1988) during times of distress as well. Therefore, PPR and capitalization may both impact drinking outcomes, though via different pathways.

In summary, previous literature has explored the effects of PPR on overall health, smoking, and sleep (Alonso-Ferres et al., 2020; Britton et al., 2019; O'Neill et al., 2020; Selcuk et al., 2017; Slatcher et al. 2015). All around, having a responsive partner has been linked to better health and well-being outcomes and better health habits such as sleeping and smoking. These previous findings suggest that in romantic couples, PPR is a key mechanism that allows couples to engage in better health habits and should theoretically predict decreased alcohol consumption and better perceived health. Moreover, previous theoretical models (Selcuk & Slatcher, 2017) hypothesize that PPR may act as a buffer, protecting couples from the negative health effects of distress, though limited research has tested this hypothesis thus far.

Distress, PPR, Drinking, and Perceived Health in the Military Population

Due to the unique nature of their employment, service members are at a greater risk for negative health outcomes, such as increased alcohol use and poorer health (Bray et al., 1999; Stahre et al., 2009; Waller et al., 2015). Furthermore, military employees are more likely to be married than civilians (Hogan & Seifert, 2010). Thus, examining the potential positive effects of a responsive spouse in the military population is a promising avenue for research. Due to the unique distress that military employees are under, the impact of a responsive, understanding, and validating partner can be highly significant.

Stress and social support have been linked to substance use in military populations. McCabe and colleagues (2019) examined these variables in a sample of

participants who had either recently separated from the military or were currently serving in the National Guard. McCabe and colleagues (2019) found that post-traumatic stress disorder (PTSD) symptoms were linked to alcohol problems indirectly via coping motives, indicating that participants with more PTSD symptoms drank more due to their endorsement of drinking as a coping mechanism. Interestingly, this indirect effect was attenuated for those who perceived their friends as supportive but strengthened for those who perceived their family as supportive (McCabe et al., 2019). While the perceived support from friends aligns with the stress-buffering hypothesis, the opposite results from family support could indicate that support is not always helpful and can increase negative health behaviors (McCabe et al., 2019). Perceived partner responsiveness, however, directly relates to how validated and understood people feel by their partners (Reis & Shaver, 1988). While direct support could undermine one's autonomy (Selcuk & Ong, 2013), feeling validated and understood by one's partner may partly explain the mixed results by McCabe and colleagues (2019).

Psychological distress has also been linked to drinking in military-connected populations. Mohr and colleagues (2018) examined drinking motives, alcohol-related problems, such as drinking-related behaviors and injuries, alcohol consumption quantity and frequency, and psychological distress in a sample of separated active-duty and current National Guard service members. The researchers found that psychological distress was a significant predictor of alcohol-related problems, drinking quantity, and frequency (Mohr et al., 2018). Moreover, psychological distress indirectly predicted alcohol problems via coping motives, indicating that military employees and recently

separated veterans may use alcohol as a coping tool in the face of distress (Mohr et al., 2018).

Work-related stress, a significant contributor to psychological distress, has been linked to poor health outcomes in the military (Hsieh & Tsai, 2019). Hsieh and Tsai (2019) measured work stress, social support from colleagues and supervisors, and physical and mental health (symptoms of anxiety, depression, pain, and sleep issues) in a sample of service members in Taiwan. The results indicated that work stress was a significant predictor of poorer mental and physical health, and this effect was moderated by social support, indicating that the effects of stress on health were attenuated for those with strong social support systems (Hsieh & Tsai, 2019). Furthermore, this effect was stronger for men than women (Hsieh & Tsai, 2019).

PPR has also been linked to better sleep - a known predictor of better perceived health (Dalmases et al., 2019), in military samples. O'Neill and colleagues (2020) examined PPR, pain, and sleep in military-connected couples in a daily diary study. The results indicated that for both veterans and partners, reporting PPR was linked to better sleep outcomes via increased positive affect (O'Neill et al., 2020). Perceiving one's partner as responsive can thus lead to better mood and sleep. These findings provide support for the potential link between PPR and perceived health, as poor sleep is a known predictor of poor perceived health (Dalmases et al., 2019).

To summarize, previous literature has examined the direct effects of psychological distress on drinking and health outcomes in military populations (McCabe et al., 2019; Mohr et al., 2018). Social support from friends has also been found to buffer the effects of stress on drinking outcomes in the military (McCabe et al., 2019).

Psychological distress has also been found to predict alcohol use via coping motives, indicating that service members may drink to cope with their distress (Mohr et al., 2018). Work-related stress, a significant contributor to psychological distress (Pflanz & Sonnek, 2002), greatly impacts both the physical and mental health of service members (Hsieh & Tsai, 2019). Lastly, PPR has been linked to better sleep for both partners in military-connected couples (O'Neill et al., 2020), suggesting PPR may also impact perceived health, a closely related concept to sleep. Together, these findings indicate that psychological distress and PPR can have a direct effect on drinking and perceived health. Theoretically, PPR could also act as a buffer against the negative effects of distress on health, though limited research has examined these indirect effects.

Purpose of the Present Study

The present study investigated the relationship between psychological distress, perceived partner responsiveness, alcohol consumption, and perceived health among U.S. National Guard Service Members (SM). Utilizing the "Strength and Strain Model of Marital Quality and Physical Health" (see Figure 1, Slatcher & Selcuk, 2017), this study examined how PPR directly impacts drinking and perceived health and also acts as a distress-buffering mechanism for better perceived health, and drinking outcomes in the U.S. National Guard Service Members, as shown in Figure 2. I hypothesized the following:

> Hypothesis 1: Psychological distress at baseline was expected to predict higher levels of alcohol consumption (H1a) and poorer perceived health (H1b) at the 9-month follow-up.

Hypothesis 2: PPR at baseline was also expected to predict lower levels of alcohol consumption (H2a) and better perceived health (H2b) at the 9-month follow-up.

Hypothesis 3: Per the stress-buffering hypothesis, PPR was expected to moderate the relationship between psychological distress and alcohol consumption (H3a) and perceived health (H3b). Specifically, participants who reported high levels of PPR are expected to be less impacted by the experiences of distress than those who reported lower levels of PPR.

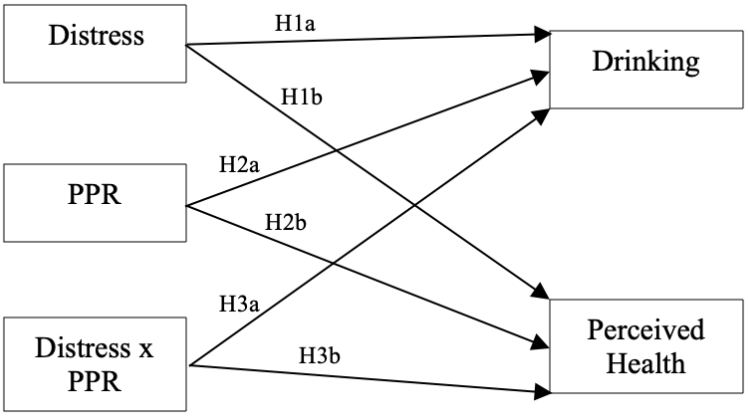

Figure 2 – *Hypothesized Direct and Indirect Effects of Psychological Distress and Perceived Partner Responsiveness*

Method

Study Overview

This study comprised a secondary data analysis from the Military Employee Sleep and Health (MESH) intervention study (Hammer et al., 2021). The MESH study participants (N = 704) were full-time U.S. National Guard Service Members (worked 32 hours or more per week). The service members completed a baseline assessment and four follow-up assessments, of which the 9-month follow-up was of interest for the current project. Using the 9-month follow-up allowed for a longitudinal examination of health outcomes and has also frequently been used in the alcohol literature (Flannery et al., 2003; Postel et al., 2015; Zhang et al., 2006). The military employees' supervisors completed a family supportive supervisor behavior (FSSB) training as a part of the intervention, aimed to increase supervisors' support behaviors toward employees' families and sleep habits. A cluster-randomized controlled trial design was implemented with a waitlist control group. Additionally, participants in the intervention group received personalized sleep feedback after wearing an actigraphic device for the first three weeks of the study. Due to having to wear the actigraphic device, no pilots from the National Guard could participate in the study. In the present project, the intervention condition was controlled for in all analyses.

Participants

Participants were recruited from the National Guard over a two-year period. Unit leaders were provided with information regarding the study prior to the start of

recruitment activities which after they relayed this information to their employees via email. After screening interested National Guard members for eligibility (working full-time, 32 hours or more) and obtaining informed consent, participants were emailed a survey using the REDCap (Research Electronic Data Capture) platform. Participants were compensated for completing the surveys with a $25 gift card per survey. In terms of confidentiality, each participant had a unique identifier that was used for linking them to their survey data.

At the time of recruitment, the National Guard had approximately 1,770 service members in this state, of which 975 signed up to participate. After removing supervisors and those who did not complete the baseline survey, 704 service members participated in the study. Of these participants, 74.7% were men, 21.1% were women, and on average, 36.2 years (SD = 9.08, range = 19-69). The majority of the participants were White (80.7%), and 8.9% were Latinx or Hispanic. More than half of the participants were married (65.5%) or living with a partner (11.6%).

Procedures

After completing the baseline survey, the follow-up surveys at four months and nine months were emailed to participants with email and/or phone reminders. The study started in 2017 and went on until 2020, with most participants completing their 9-month survey before the onset of the Covid-19 pandemic. The onset of the pandemic was controlled for in all data analyses. Attrition rates were examined to investigate how many participants completed the 9-month follow-up survey. Out of the 704 participants who completed the baseline survey, 79.5% continued on and completed their 9-month follow-

up. A logistic regression analysis was conducted to examine if there were differences in the outcome variables due to attrition. The results indicated that there were no significant differences between those who completed or did not complete the 9-month follow-up survey on baseline alcohol use (p = .70) or perceived health (p = .53).

Measures

Emotional/Psychological Distress. Psychological distress was captured using the six-item measure (K6) developed by Kessler and colleagues (2002). The items revolve around depressive, anxious, and physical symptoms. The items include "During the last 30 days, about how often did you feel hopeless?", "...you feel restless or fidgety?", "...you feel that everything was an effort?", and "...you feel nervous?" (Kessler et al., 2002). The response options range from "All of the time" to "None of the time" (Kessler et al., 2002). The K6 measure has been found to have acceptable discriminant validity, test-retest reliability (.88), and internal reliability with an alpha estimate of .83 (Staples et al., 2019).

Perceived Partner Responsiveness. The second independent variable of interest, perceived partner responsiveness (PPR), was measured using three questions adapted from Reis and Shaver (1988; O'Neill et al., 2020); "To what degree do you feel accepted by your spouse/partner?", "To what degree do you feel understood by your spouse/partner?", and "To what degree do you feel cared for by your spouse/partner?". Responses to the PPR range on a scale from one to seven, one representing "Not at all" and seven representing "Very much" (Reis & Shaver, 1988).

Alcohol Consumption. The first dependent variable of interest, alcohol consumption, was measured using the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) scale (Bush et al., 1998). AUDIT-C was first used in Veterans Affairs populations but has since also been utilized in primary care patients and has been found to be reliable for detecting heavy drinkers and alcohol misuse (Bradley et al., 2007). The measure includes questions regarding the quantity and frequency of alcohol consumption: "How many standard drinks containing alcohol do you have… when you are drinking?" and "How often do you have a drink containing alcohol" (Bush et al., 1998). Literature typically suggests that consuming five or more drinks at once is considered heavy drinking (Mattiko et al., 2011; Stahre et al., 2009; Waller et al., 2015). Because the AUDIT-C has a high cut-off for heavy drinking ("How often do you have six or more drinks on one occasion?"), The quantity and frequency of alcoholic drinks consumed were also evaluated as separate dependent variables. The quantity of drinks consumed was assessed using the question "How many standard drinks containing alcohol do you have... when you are drinking?" and frequency of alcohol consumption was assessed using the question "How often do you have a drink containing alcohol" from the AUDIT-C measure (Bush et al., 1998).

Perceived Health. The second dependent variable of interest, perceived health, was measured using a scale by Hobfoll and colleagues (2012). The measure includes four items regarding general health and health problems. Example items include "To what extent do you have any particular health problems?", "...feel healthy enough to carry out the things you would like to do?" (Hobfoll et al., 2012). Responses to the questions range on a scale from one to five, with one signifying poorer health (e.g., never being able to

carry out the thing one would like to do) and five indicating better health (Hobfoll et al., 2012).

Data Analysis

All data analyses were conducted using the statistical software packages SPSS and Mplus. SPSS was used for examining assumptions descriptive statistics, while Mplus was used for hypothesis testing. Mplus uses full information maximum likelihood (FIML) estimation by default, and it has been the recommended estimation method especially with missing data (Cham et al., 2017). Assumptions regarding linearity, normal distribution, and the independence of the key variables were assesses. Normal distribution of residuals of the outcome variables, perceived health, and AUDIT-C scores, was examined by looking at histograms of residuals and outliers. An examination of histograms of the residuals indicated that they were approximately normally distributed, with the distribution of the residuals on the AUDIT-C scale slightly platykurtic (Cohen et al., 2003). Outliers on the outcome variables and predictor variables were examined using Cook's distance, which indicated no influential outliers, as no outlier had a value greater than one on Cook's distance (Bollen & Jackman, 1985). The Durbin-Watson tests indicated that the residuals were independent, since for both outcome variables, scores on this test were close to two (Durbin & Watson, 1950, 151). To examine any potential heteroscedasticity of the residuals, scatterplots of predicted values against standardized residuals were examined. The scatterplots indicated a slight tendency for residuals to cluster to the left for the AUDIT-C outcome, and to the right for the perceived health outcome, but no severe heteroscedasticity was observed (Cohen et al., 2003). Adding a

curve to the residual scatterplots showed a linear pattern. The variance inflation factors (VIF) score indicated no multicollinearity between the variables, based on a cutoff score of six or higher (Neter et al., 1989).

First, a correlation matrix was obtained to determine the stability of the predictors, outcome variables, and potential covariates. Pearson's correlations, along with previous research, were be used to determine potential covariates of interest. Both predictor variables, psychological distress and perceived partner responsiveness, as well as the outcome variables, alcohol use and perceived health, were relatively stable over time. Baseline AUDIT-C scores had a strong positive correlation with 9-month AUDIT-C scores ($r = .74$, $p < .001$) as did baseline perceived health scores and 9-month perceived health scores ($r = .69$, $p < .001$), indicating that there were little difference in the outcome variables over time. Therefore, regression analyses were run without controlling for the outcome variables at baseline. As per the correlation matrix, gender emerged as an important covariate of alcohol use ($r = -.15$, $p = .001$). Furthermore, combat exposure was controlled for in analyses with alcohol use at the outcome variable, as it had a significant correlation with the AUDIT-C scores ($r = .16$, $p = .005$) and has been linked to alcohol use in previous literature (Bray et al., 2013). Similarly, age was controlled for in all analyses including perceived health ($r = -.17$, $p < .001$) as was gender, since previous literature has found men to be more likely to report better perceived health (e.g., Anson et al., 1993). The MESH study intervention (0 = control, 1 = intervention) and the onset of the Covid-19 pandemic were controlled for in all analyses.

To examine hypotheses 1a and 2a, psychological distress and PPR were entered simultaneously into the regression model as predictors of AUDIT-C scores at nine

months, while controlling for combat exposure and gender. This analysis was repeated with drinking frequency and drinking quantity as the outcome variables. To examine hypotheses 1b and 2b, psychological distress and PPR were entered as predictors of perceived health at the nine months, while controlling for age and gender.

The third hypothesis was tested using two moderation models in which the interaction between psychological distress and partner responsiveness, grand mean centered, at baseline, predicted alcohol consumption and perceived health at nine months. First, the interaction term between psychological distress and PPR was entered as a predictor of AUDIT-C scores at nine months, while controlling for combat exposure and gender. This model was repeated with alcohol quantity and frequency of drinking as the outcome variables. Second, the interaction term between psychological distress and PPR was entered as a predictor of perceived health at nine months, while controlling for age and gender.

Results

Descriptive

Descriptive statistics were obtained for all key variables. Psychological distress had a mean score of 1.65 (SD = .67), while PPR had a mean score of 5.90 (SD = 1.31) in this sample of National Guard employees. A mean score of 1.65 on the K6 psychological distress measure is relatively low, considering that a score of five or higher has been suggested as indicative of moderate distress, and a score of 13 or higher indicative of severe mental illness (Prochaska et al., 2012). On average, the National Guard employees had a score of 2.41 (SD = 1.83) on the AUDIT-C scale, which is also relatively low. Scores of three or higher for women and scores of four or higher for men have been used as suggestive of alcohol misuse (Bradley et al., 2007). In terms of frequency of drinking, the average for the sample was 1.71 (SD = 1.08), which indicates that on average participants drank from two to four times a month to monthly or less. The mean for quantity of drinks consumed was 1.22 (SD = .51), suggesting that on average participants

Table 1

Descriptive Statistics and Correlations for the Key Variables

Variable	*n*	*M*	*SD*	1	2	3	4	5	6	7	8	9
1. PPR	552	5.90	1.31	-								
2. Distress	687	1.65	.67	-.40**	-							
3. AUDIT-C	688	2.61	1.97	-.14**	.10	-						
4. 9m AUDIT-C	510	2.41	1.83	-.11*	.14*	.74**	-					
5. Perceived health	688	3.90	.64	.29**	-.33**	-.06	-.03	-				
6. 9m Perceived health	510	3.81	.71	.30**	-.37**	-.03	-.04	.69**	-			
7. Age	700	36.21	9.08	-.03	-.03	-.01	-.03	-.18**	-.17**	-		
8. Gender	704	1.25	.44	-.04	.07	-.15**	-.15**	-.07	-.04	-.06	-	
9. Combat exposure	406	4.01	5.39	-.10	.13*	.21**	.16*	-.10*	-.10	.05	-.14*	-

*$p < .05$. **$p < .001$.

consumed anywhere between two to four drinks at once. The perceived health scale had a mean of 3.81 (SD = .71). Lastly, there was only one participant who responded as "Other" on the gender measure, and thus this participant was excluded from the regression and moderation analyses.

Correlations

In terms of the predictor and outcome variables, psychological distress had a weak but positive relationship with 9-month AUDIT-C scores (r = .14, p = .001). On the contrary, psychological distress had a moderate negative relationship with 9-month perceived health (r = -.37, p < .001). PPR had a small but significant negative correlation with 9-month AUDIT-C scores (r = -.11, p < .03). Furthermore, PPR had a moderate positive correlation with perceived health (r = .30, p < .001). See Table 1 for a full correlation table. Since the National Guard service members were recruited from and worked in groups, it was necessary to determine how much variance in the outcome variables was due to employees working together. To examine this, intraclass correlation coefficients (ICCs) were obtained for both outcome measures, AUDIT-C and perceived health. The ICC for AUDIT-C was .03, indicating that there was very little variability in AUDIT-C scores between groups of soldiers. Similarly, the ICC for perceived health was .002, indicating that very little variance in perceived health was due to workgroups (Hox, 2010).

Regression analyses

The first regression model, with psychological distress and PPR predicting AUDIT-C scores at nine months, revealed that psychological distress was not a significant predictor of AUDIT-C scores (B = .05, SE = .19, β = .02, p = .79). PPR, on the other hand, was approaching significance in predicting AUDIT-C scores at nine months (B = -.18, SE = .09, β = -.13, p = .05), indicating that for each unit increase in PPR, AUDIT-C scores decreased by .18. The entire model, with psychological distress, PPR, combat exposure, gender, intervention condition, and the onset of Covid-19, predicted approximately 4% of variance in AUDIT-C scores, which was not significant (p = .11). This regression model was replicated by replacing AUDIT-C scores with drinking frequency and quantity of drinks as the outcome variables. Psychological distress remained insignificant in predicting frequency of drinking, B = .07, SE = .11, β = .05, p = .48, and quantity of drinks, B = -.03, SE = .05, β = -.05, p = .54. PPR was also not a significant predictor of frequency of drinking (B = -.06, SE = .05, β = -.09, p = .18) or quantity of drinks (B = -.03, SE = .05, β = -.07, p = .32).

The second regression model, with psychological distress and PPR predicting perceived health at nine months, revealed that psychological distress was a significant predictor of perceived health, B = -.35, SE = .05, β = -.31, p < .001, indicating that for each unit increase in psychological distress, perceived health decreased by .35 points. Similarly, PPR was a significant predictor of perceived health at nine months, B = .08, SE = .03, β = .16, p = .001, indicating that for each unit increase in PPR, perceived health increased by .08 points. The entire model, with psychological distress, PPR, age, gender,

intervention condition, and the onset of Covid-19, predicted approximately 19% of variance in perceived health, which was significant ($p < .001$).

Moderation analyses

The moderation analyses in which the interaction term between psychological distress and PPR was added as a predictor of AUDIT-C scores revealed that PPR did not moderate the relationship between distress and AUDIT-C, $B = .10$, $SE = .11$, $\beta = .07$, $p = .35$. PPR alone was a significant predictor of AUDIT-C scores when the interaction term was added into the model, $B = -.20$, $SE = .10$, $\beta = -.15$, $p = .03$. When replicating this model with quantity of drinks and frequency of drinking, the interaction term was not a significant predictor of quantity of drinks ($B = .02$, $SE = .03$, $\beta = .05$, $p = .48$), or frequency of drinking ($B = .06$, $SE = .06$, $\beta = .07$, $p = .34$).

The second moderation analysis in which the interaction term between psychological distress and PPR was added as a predictor of perceived health revealed that the interaction term did not significantly predict perceived health, $B = -.05$, $SE = .03$, $\beta = -.09$, $p = .10$. PPR ($B = .10$, $SE = .03$, $\beta = .18$, $p < .001$) and psychological distress ($B = -.38$, $SE = .06$, $\beta = -.35$, $p < .001$) both alone remained significant predictors of perceived health scores.

Discussion

Summary of Study Goals

The goals of the present study were to examine the effects of psychological distress and PPR on drinking and health outcomes in a population in which distress and drinking are common - full-time service members (Bray et al., 1999; Mohr et al., 2018; Stahre et al., 2009; Waller et al., 2015). The majority of service members are married or cohabitating with a long-term partner (Hogan & Seifert, 2010), making this population ideal for the examination of the positive effects that an understanding, validating, and caring partner can have on the service member.

Previous literature on partner responsiveness, addictive behaviors, and physical health outcomes have been cross-sectional or focused on short-term follow-ups, typically less than or around one month (e.g., Britton et al., 2019; Mohr et al., 2016; O'Neill et al., 2020; Selcuk et al., 2017). Thus, a strength of the present study was the longitudinal nature of the data. This research contributed to the literature by informing us how partner responsiveness can impact and sustain physical health outcomes over time. Indeed, the findings of the present study indicated that National Guard employees who perceived their partners as more responsive, were more likely to report better perceived health nine months later. To my knowledge, this is the first study looking into the relationship between PPR and perceived health longitudinally, thus expanding what we know about the positive effects of PPR on health outcomes.

Beyond the importance of longitudinal research in military populations, these findings also provided support for theories on relationships and health outcomes. As

discussed earlier, the marital strengths and strains model by Slatcher and Selcuk (2017) hypothesizes that marital strengths, such as partner responsiveness, can have a positive impact on health behaviors, such as drinking habits. Interestingly, in the present study, partner responsiveness, a marital strength, only had only a weak effect on drinking outcomes. The lack of findings in terms of this health habit could be partially due to the overall low levels of alcohol consumption and infrequent drinking reported by the participants. However, the model also proposes that marital strengths can positively impact long-term health outcomes, such as overall perceived health (Slatcher & Selcuk, 2017), which the findings of the current study supported. In summary, the results of the present study also provided support for these direct effects of marital strengths on perceived health in the military population.

Furthermore, the strengths and stressors model also hypothesizes that marital strengths, such as partner responsiveness, can protect one against the negative health consequences that distress may have (Slatcher & Selcuk, 2017). This hypothesis was tested using PPR as the moderator in the relationship between psychological distress, drinking, and perceived health. Surprisingly, the results from the present study do not support the hypothesis that PPR, a marital strength, buffers people in romantic relationships from the negative health consequences of distress. This may be in part due to low levels of distress and alcohol consumption in the present sample, and due to psychological distress having a weak relationship with drinking in the present study.

It is also possible that distress, or other affective experiences, may mediate the relationship between PPR and health outcomes. Indeed, Selcuk and colleagues (2017) found that PPR predicted better sleep via reduced anxiety and depression symptoms.

Similarly, Farrell and colleagues (2018) suggested that positive and negative affect could be the indirect link connecting relationships to health outcomes, which a few studies have tested. Marital strengths could increase positive and reduce negative affect, which in turn could lead to better health outcomes in couples (Farrell et al., 2018). Therefore, it could be that the relationship between PPR, psychological distress and perceived health would be better modelled via mediation, in which PPR predicts lower levels of distress, which in turn predicts better perceived health. Beyond modeling issues, the lack of buffering in the present study could also be due to reporting bias, which will be discussed further in the limitations section. In summary, the lack of significant buffering findings in the present study could be due to modeling issues, and overall low levels of distress and drinking in the present sample.

Limitations

The limitations of the present study may aid in explaining the lack of results in regard to psychological distress and the alcohol outcomes, as well as the lack of moderation findings. It is possible that the lack of interaction effects between PPR and distress on the selected health outcomes could be due to reporting bias. Previous research has found that a large barrier to mental health treatment and care in military populations is military employees' worry over the military finding out about their mental health concerns, having a record of mental health problems, and what these issues may mean for the employment of these military personnel (Valenstein et al., 2014). These concerns may have been especially valid for our sample of National Guard employees, who received the recruitment email from their supervisors. Even though individual participant data was not

shared with the National Guard, the participants of the present study may have been downplaying their mental health symptoms, such as those inquired about in the K6 psychological distress measure, due to fears about their supervisor or the National Guard finding out about them. Such reporting biases could explain the lack of findings between psychological distress and alcohol use, as well as the lack of interaction effects.

Beyond reporting bias, it is also possible that mental health concerns, such as distress and substance use, may become stronger after the employee is discharged from service. Indeed, previous literature has found that recently separated veterans used significantly more marijuana and hard drugs, in comparison to active-duty service members (Derefinko et al., 2018). Loneliness and reports of military-related trauma also increased after service members separated from the military (Derefinko et al., 2018). Furthermore, veterans themselves have reported increasing their substance use post separation from the military (Sayer et al., 2010). In conclusion, future research could look into the effects of psychological distress on drinking outcomes in veterans, and whether marital strengths, such as PPR, may be protective against the adverse effects of distress on health in veteran populations.

Beyond reporting bias, the limitations of the present study also include the diversity of the sample, the generalizability of the findings to other populations, and the interpretation of the regression and moderation models. Though the sample used was representative of the military population in terms of gender, the majority of the participants were White men. Moreover, because only the service member data was analyzed, the current findings cannot be generalized to service member spouses and partners. Furthermore, military families experience their own unique stressors (Pflanz &

Sonnek, 2002), and these experiences, the way they interact with partner responsiveness and health outcomes may not be generalizable to other populations. However, theoretically speaking, there is no reason why the present findings could not be replicated in other populations, and the research conducted with military populations may be especially relevant for other high-risk professions, such as first responders (Geuzinge et al., 2020).

Beyond demographics, there may be differences in the representativeness in our National Guard sample based on who chose to participate and who declined. The intervention condition participants received an actigraphic device to track their sleep, after which they received individualized feedback on their sleep. Those National Guard members who ultimately chose to participate in the study may have been more knowledgeable about or interested in their own health than National Guard employees who chose not to participate. With that being said, since we do not know anything about the service members who chose not to participate, we cannot know for certain exactly if or how they might differ from the study participants.

Lastly, statistical methodology and the variables used suggest that there is a temporal association between PPR and psychological distress at baseline, and perceived health nine months later. Though the present study is longitudinal in nature, no interpretations regarding causality can be made. In order to establish causality, all other potential covariates need to be controlled for, and the temporal order of events needs to be established. Though the present study controls for some of the covariates that are likely related to health in couples, such as age and gender, it is entirely possible that there are other variables, beyond perceived partner responsiveness and psychological distress,

that impact the outcomes of interest. It is also possible that the relationships between PPR, psychological distress, and perceived health are bidirectional. For example, previous literature has found that experiencing distress predicts future decreased perceived health, which in turn predicts further psychological distress (Farmer & Ferraro, 1997). Regardless, the present study provides a snapshot over nine months of how PPR and psychological distress impact health outcomes.

Future Directions

As discussed earlier, one area of future research could be to identify the ways in which marital strengths, such as partner responsiveness, impacts health outcomes. The relationship between marital strengths, stress, and health outcomes may exist, but might not always show up as "stress-buffering". It is possible that responsiveness impacts health outcomes via other related mechanism, such as reduced negative affect or stress, as Farrell and colleagues (2018) suggested. The mechanisms through which partner responsiveness impacts health outcomes, is one important avenue for future research.

Beyond examining the positive effects of partner responsiveness, exploring the effects of distress in current military employees in comparison to veterans and other populations, could be of value. Surprisingly, the present study did not find support for a strong relationship between distress and alcohol use in National Guard service members, which could be due to reporting bias. However, future research should aim to examine if distress and substance use are of great concern in active-duty service members, or if these issues may potentially arise in post-separation veterans.

The present study lays a fruitful ground for future work on intimate relationships and health outcomes. In military populations specifically, future research could expand the present findings by including the effects of partner responsiveness from the perspective of the service member's spouse or partner. Knowing what aspects of interpersonal relationships can impact health outcomes on both sides of the partnership can lay the groundwork for future intervention studies. Indeed, interventions targeting distressed couples have been successful in improving relationships and health, an example of which would be the OurRelationship intervention (Le et al., 2023). The OurRelationship intervention uses online learning and coaching as tools for couples to understand and respond to the major issues in their relationship (Le et al., 2023). However, to my knowledge, no couple intervention has directly targeted perceived partner responsiveness and its potential in improving health outcomes for couples.

As more research is published on the positive effects of partner responsiveness, future researchers may benefit from going back to the theoretical examination of what exactly makes one perceive their partner as responsive. As Reis and Shaver (1988) described, feeling understood, validated, and cared for are the basic ingredients of partner responsiveness. Furthermore, Itzchakov and colleagues (2022) added that high-quality listening is a necessary step toward responsiveness. Attention, comprehension, and intent are needed from the partner in order to engage in high-quality listening (Itzchakov et al., 2022). Taking the empirical findings and the theoretical and structural background of PPR, interventions can be built and tested with the goal of improving intimate relationships and health outcomes for both partners down the line.

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