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SHIP CLIMATE AND SHIP PERFORMANCE

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We hypothesized that ship-level cohesion and hostile work environment have both main and interactive effects on ship performance. Data collected from 11,921 sailors on 45 U.S. Navy ships and archival Navy performance data revealed that their joint effects on ship performance are additive rather than interactive.

The implicit assumption underlying a considerable body of work investigating organizational climate is that facets of an organization's climate affect performance-related outcomes (e.g., James & Jones, 1974; Mayer, Ehrhart, & Schneider, 2009). A sizeable literature has also focused on the construct of unit cohesion as a facet of climate at the level of a group, team, or business unit (e.g., Mullen & Copper, 1994). An emerging research area has also examined hostile work environment as another facet of climate (e.g., Johnston,

2008). With the present study, we investigated their joint effects on unit performance operationalized as the effectiveness of operating ships in the U.S. Navy. Specifically, we argue that while both cohesion and hostile work environment have main effects on performance, their joint effects are interactive. That is, the relationship between cohesion and performance is moderated by hostile work environment, such that the relationship is positive (negative) among ships with low (high) levels of a hostile work environment.

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Unit Cohesion

Festinger (1950) described cohesion as the total field of forces that act on members to remain in the unit. Similar definitions suggest that cohesion is the extent to which units are unified, coherent, and organized (Lickel, Hamilton, Lewis, Sherman, Wiczorkowska, & Uhles, 2000), and the extent to which unit members are attracted to the unit and the task, are bonded to one another, and desire to retain unit membership (e.g., Festinger, Schachter, & Back, 1950; Mullen & Copper, 1994). Summarizing these definitions, Carron, Brawley, and Widmeyer (1998) described unit cohesion as “a dynamic process that is reflected in the tendency for a group to stick together and remain united in its pursuit of instrumental objectives and/or for the satisfaction of members’ affective needs” (p. 213). Most scholars have viewed cohesion as a unitary construct, although some have argued that it is multidimensional (Carron, 1982; Carless & De Paola, 2000) and explored links between its components – interpersonal attraction, group pride, and task commitment – and performance (e.g., Carron, Widmeyer, & Brawley, 1985; Mullen & Copper, 1994).

Scholars have long considered cohesion as a critical success factor for intact units (e.g., Sánchez & Yurrebaso, 2009). That is, cohesive units are more viable than (Barrick, Stewart, Neubert, & Mount, 1998), and outperform low-cohesion units (e.g., Mullen & Copper, 1994; Hausknecht, Trevor, & Howard, 2009), and yield higher levels of both job and personal satisfaction among their members (McGrath, 1984).

Cohesion impacts effectiveness through both capability and motivation. Pointing out that cohesive groups have high levels of

team mental model convergence (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000), efficiency of language behavior (Mickelson & Campbell, 1975), and use of transactive memory systems (Hollingshead, 1998; 2000), Beal, Cohen, Burke, and McLendon (2003, p. 991) noted that cohesive groups more efficiently utilize group resources than low-cohesion groups.

Unit cohesion also has been observed to have positive effects on an individual's contribution to a unit via motivation (Carron, Colman, Wheeler, & Stevens, 2002). – Put another way, an attachment to the unit and its members creates a desire to exert effort to promote the well-being of the unit (Sluss, van Dick, & Thompson, 2011; van Knippenberg, 2000). Cohesion also yields adherence behavior (i.e., behavior that supports group functioning; Prapavessis & Carron, 1997), assuming responsibility for negative outcomes (e.g., Brawley, Carron, & Widmeyer, 1987), collective efficacy (e.g., Paskevich, Brawley, Dorsch, & Widmeyer, 1999), conformity to unit norms (e.g., Shields, Bredemeier, Gardner, & Boston, 1995), tolerance of the negative impact of disruptive events (e.g., Brawley, Carron, & Widmeyer, 1988), and performance (Prapavessis & Carron, 1997).

Furthermore, in reporting results of their meta-analysis, Carron et al. (2002), concluded that the link between cohesion and performance is reciprocal; that is, cohesion increases the unit's performance, and effective performance increases cohesion. The historical record in regards to the relationship between unit cohesion and performance differs somewhat from the findings of Carron et al. (2002). Surprisingly, empirical assessments of the relation between unit cohesion and unit performance have been inconsistent, causing some

scholars to question the effect (Steiner, 1972; Tziner, 1982). More recently, scholars have approached the issue in at least three ways. One of these ways has been to argue that unit cohesion sometimes has a negative impact on unit performance-related outcomes because of pressure to conform, groupthink, and social loafing (e.g., Hoigaard, Säfvenbom, & Tonnessen, 2006). In the other, scholars have employed meta-analytic techniques to identify situations in which the effect is strong or weak (e.g., Beal et al., 2003; Carron et al., 2002). Findings from this body of work suggest that moderators of the cohesion-performance relationship include group size, group reality, level of analysis, task type, and group interdependence. The third approach, based on the Categorization Elaboration Model (CEM) (Van Knippenberg, De Dreu, & Homan, 2004) operates from the standpoint that all diversity factors affecting unit cohesion may impact group performance positively or negatively depending on situational characteristics. CEM also proposes that high levels of task motivation may have a positive impact on performance (Van Knippenberg et al., 2004).

Based on these theoretical observations, we argue that operational military organizations typically require considerable interdependencies, particularly combat naval vessels that function in high-preparedness/mission-ready or operational modes. Hence, unit cohesion is likely critical to mission readiness and effectiveness (i.e., unit performance). In line with meta-analytic results (e.g., Beal et al., 2003), we anticipated that cohesion would be related to effectiveness. Cohesive ships feature sailors who are committed to their tasks and identify with their ships. Consequently, they should be more highly motivated to perform

and capable of effectiveness in task execution than low-cohesion ships.

Hypothesis 1: Ship-level perceptions of unit cohesion are positively related to ship-level performance.

Hostile Work Environment

A hostile work environment refers to one in which verbal or physical behavior is pervasive enough to create an abusive climate that interferes with work performance (Bell, McLaughlin, & Sequiera, 2002). Importantly, coworker or manager behaviors that are violent, offensive, or discriminatory can contribute to a hostile work environment regardless of whether one is the target of such behaviors (Hulin, Fitzgerald, & Drasgow, 1996; Sorenson, Mangione-Lambie, & Luzio, 1998). For example, Sorenson and colleagues (1998) found that both bystanders and victims of sexual harassment reported heightened negative affect and motivation loss. In addition to sexual harassment, perceived discrimination based on race, national origin, age, religion, disability, or sexual orientation can also contribute to a hostile work environment. Concern over hostile work environments is warranted because the host of deleterious outcomes with which such environments are associated includes decreases in both individual and organization-level performance (Goldman, Gutek, Stein, & Lewis, 2006; Jensen & Gutek, 1982; Willness, Steel, & Lee, 2007).

Diversity climate—“perceptions about the organization’s diversity-related formal structure characteristics and informal values” (Gonzalez & DeNisi, 2009, p. 24)—and equal opportunity (EO) climate—perceptions of the opportunities and potential favoritism afforded to certain

groups of employees (Dansby & Landis, 1991)—may serve as key indicators of hostile work environments. Indeed, Naff and Thompson (2000) identified the elimination of hostile work environment behaviors as an integral component of high diversity climate perceptions in the Federal Aviation Administration, and researchers investigating hostile work environments in military settings have predominantly done so under the rubric of equal opportunity (EO) climate (e.g., Estrada, Stetz, & Harbke, 2007; Knouse & Dansby, 1999). The unfair policies and tolerance of discrimination typical of an organization with a low diversity climate or EO climate likely send a message to employees that procedural justice is not the rule and that psychological contracts are not being upheld (Roberson & Stevens, 2006).

Linking hostile work environment and performance – The relationship between hostile work environment perceptions and performance can be at least partially viewed through the lenses of social exchange theory (Blau, 1964) and psychological contracts (Morrison & Robinson, 1997). Individuals enter an organization with ideas regarding the mutual obligations between the organization and themselves, thereby forming psychological contracts. If they perform all their task duties and remain committed to the organization, they can expect a number of benefits in the form of tangible and intangible support resources (Organ & Konovsky, 1989).

Hostile work environments may represent a breach in psychological contracts, particularly among women and minorities that are most affected by the hostile work environment (Chrobot-Mason, 2003). Employees may reciprocate this lack of expected support in the form of reduced effort and withdrawal, leading to lower

aggregate performance of the organization (McKay, Avery, & Morris, 2009). As Gibney, Zagenczyk, and Masters (2009, p. 667) argued, individuals “who believe that treatment provided by the organization is negative should reciprocate by behaving in a manner that harms the organization.” Boswell and Olson-Buchanan (2004) found a direct link between perceived mistreatment at work and withdrawal behaviors. Of note, previous research found that diversity climate impacted firm revenue the most when the population was demographically diverse (Gonzalez & Denisi, 2009).

Research on hostile work environments, including proxies of hostile environment in terms of diversity and EO climates, suggests that such environments yield low levels of performance. Hostile work environments violate psychological contracts and thereby, reduce individuals’ motivation to exert effort on behalf of the organization. As not only the targets of discrimination or harassment experience angst as the result of the discrimination and/or harassment (Hulin et al., 1996; Sorenson et al., 1998), a hostile work environment in a work unit is likely to yield pervasive low levels of performance among all members of an organization. Moreover, hostile behaviors create distractions from tasks, which reduces an organization’s capability to perform. Accordingly, we proposed:

Hypothesis 2: Ship-level perceptions of a hostile work environment are negatively related to ship-level performance.

Joint Effects of Cohesion and Hostile Work Environment

The joint effects of cohesion and hostile work environment may be additive or interactive. If the former postulate is true,

cohesion and hostile work environment combine additively to predict performance. That is, both cohesion and hostile work environment have significant relationships with performance, and these relationships are independent of each other. If the latter postulate is true, levels of cohesion have differential effects on performance at different levels of a hostile work environment. In other words, hostile work environment moderates the relationship between cohesion and performance.

We argue that cohesion is likely to have either negative or non-significant associations with performance in units that manifest dysfunctional behaviors that harm minority unit members. Accordingly, we examined hostile work environment as a moderator of the relationship of the cohesion-performance relationship. Below, we discuss the relationship between cohesion and performance at low and high levels of hostile work environment.

Low-Hostile Work Environment. Despite having few problems associated with a hostile work environment, low-cohesion work units are likely to perform at relatively low levels. Based on the CEM (Van Knippenberg, et al., 2004) as discussed previously, members of such units likely have little motivation to exert considerable effort on behalf of the unit, and their efforts to perform would be limited by internal operating inefficiencies. However, high-cohesion and low-hostile work environment units are likely to achieve high levels of performance because their members interact with each other efficiently and are highly motivated to exert effort. Hence, we anticipated that the cohesion-performance relation is positive among work units having low levels of a hostile work environment.

High-Hostile Work Environment. With many problems associated with a hostile work environment and low levels of cohesion causing internal operating inefficiencies and weak motivation to perform, low-cohesion, high-hostile work environment units are likely to perform at very low levels. High-cohesion, high-hostile work environment units are likely to perform poorly as well, but for different reasons. High-cohesion, high-hostile work environment units in some ways may be similar to dysfunctional families in that bad behavior may be tolerated to maintain unity. Members in high-cohesion, high-hostile work environment units may therefore tolerate and, or avoid intervening when discriminatory/harassing behaviors occur in order to maintain group harmony. Hence, the pressure to maintain group pride, a focus on the task, and a collective harmony may be dysfunctional in that unit members knowingly behave in ways that yield a hostile work environment and those behaviors not only create distractions from the tasks but also reduce motivation to perform. Therefore, we anticipated that the cohesion-performance relation is either negative or non-significant among work units having high levels of a hostile work environment. Accordingly, we proposed:

Hypothesis 3: The relationship between ship-level perceptions of unit cohesion and ship-level performance is moderated by ship-level perceptions of a hostile work environment, such that the relationship is positive (negative) among ships with low (high) levels of a hostile work environment.

Method

Sample and Procedure

We collected data from 45 ships in the U.S. Navy (M sample size = 253, SD = 157.71; $range$ = 56 to 887). The commanding officer of each ship sent a memorandum to ship personnel requesting participation. Depending on the availability of access to the Internet, participants were provided with either a confidential unique access code with which to complete the survey online or a paper copy of the survey and a response sheet. We collected cohesion and hostile work environment survey data from 11,921 (91% enlisted and 92% on active duty) of an estimated 19,835 (60.1%) sailors. Of these, 58% completed paper-and-pencil versions of the survey, and 42% completed it online. The sailors classified their race/ethnic background as follows: 48.6% white, 19.5% African-American, 10.2% Hispanic, 8.2% Asian, 1.4% as Native-American, 1.1% as Pacific Islander, 8% as multiracial; 3% of the sailors did not indicate their background. They classified their gender as follows: 87% men and 13% as women. They classified their age categories as follows: 6% between 18 and 21 years, 49% between 22 and 30 years, 18% between 31 and 40 years, 21% between 41 and 50 years, and 6% over 50 years of age.

Measures

Cohesion. We measured cohesion with the four-item Landis, Dansby, and Faley (1993) unit cohesion scale that focuses on both task and interpersonal dimensions of cohesion. The response scale ranged from 1 = "Totally agree with the statement" to 5 = "Totally disagree with the statement." High scores reflect high levels of work group cohesion.

Hostile Work Environment. Following Landis, Dansby, and Faley (1993), we measured hostile work environment with five items (e.g., "Someone made sexually suggestive remarks about another person"). The response scale ranged from 1 = "There is a very high chance that the action occurred" to 5 = "There is a very low chance that the action occurred." High scores reflect high levels of a hostile work environment.

Ship Performance. We measured ship performance in terms of the number of three available ship performance awards for the time period in which the survey data were collected. The awards were the (a) "Golden Anchor," which is awarded for retention of personnel, (b) "Battle E," which is awarded for winning a battle efficiency competition, and (c) "Meritorious Unit Commendation," which is awarded for either meritorious or valorous achievement considered outstanding when compared to other units performing similar functions. High performance scores reflect a high number of awards.

Aggregation Statistics and Data Analysis

Although scholars have argued that the overall level of mean unit-level cohesion may be more important than the level of agreement regarding cohesion (e.g., West, Patera, & Carsten, 2009), we assessed the appropriateness of aggregating cohesion and hostile work environment scores to the ship level. Specifically, we computed $r_{WG(J)}$ (Lindell & Brandt, 2000) using the rectangular distribution, which yielded a mean $r_{WG(J)}$'s of .71 for hostile work environment and .68 for cohesion. Based on LeBreton and Senter's (2008) standards for interpreting agreement estimates, our results suggest that the $r_{WG(J)}$ for hostile work environment suggested reasonable within-

group agreement, whereas the $r_{WG(j)}$ for cohesion approached the typically accepted minimum justification for aggregation (i.e., $r_{WG(j)} \geq .70$). We also calculated ICC(1) and ICC(2) for both predictors. For both hostile work environment and cohesion, the ICC(1) was .02, a small effect (LeBreton & Senter, 2008); the ANOVA on which this values were based was significant ($p < .0001$), indicating significant ship effects for both hostile work environment and cohesion. The ICC(2) values for hostile work environment and cohesion were .84 and .83, respectively, suggesting moderate group-mean reliability (Bliese, 2000).

We evaluated the factor structure of the cohesion and hostile work environment scales using confirmatory factor analysis on the individual-level data. The two-factor model fit the data well (CFI = .93, TLI = .91, RMSEA = .09; SRMR = .05).

Results

We present in Table 1 descriptive statistics, reliability estimates, and the intercorrelation matrix. As shown there, sailor perceptions of the ship's cohesion ($r = .39, p < .01$) and hostile work environment ($r = -.47, p < .01$) aggregated at the ship level were significantly related to ship performance.

To test the hypotheses, we conducted hierarchical moderated multiple regression analyses using centered predictors. As shown in Table 2 and consistent with Hypothesis 1, cohesion predicted ship performance at the first step ($\beta = 2.1, R^2 = .15, \text{both } p < .05$) but not at the second step ($\beta = .76, ns$) of the regression analysis. Consistent with Hypothesis 2, the addition of hostile work environment ($\beta = -1.98, p < .05$) at the second step contributed unique variance ($\Delta R^2 = .08, p < .05$). Inconsistent

with Hypothesis 3, the cohesion x hostile work environment cross-product term did not contribute unique variance ($\beta = 2.60; \Delta R^2 = .005, ns$) at the third step.

Discussion

We hypothesized and found that ship-level perceptions of both cohesion and hostile work environment have main effects on ship performance. However, the data did not support our hypothesis that the relationship between ship-level perceptions of unit cohesion and ship-level performance is moderated by ship-level perceptions of a hostile work environment. Hence, we learned that both cohesion and hostile work environment are related to performance, but these relationships are independent of each other.

Based on these results, it is evident that both cohesion and hostile work environment have an impact on ship performance. The mechanisms by which these linkages operate are speculative; however, it is likely that both cohesion and hostile work environments may affect motivation and capability to perform. Cohesive ships are therefore likely to feature sailors who are committed to their tasks, and identify with their ships,. Sailors on these ships are likely to be more highly motivated and capable of executing their tasks than low-cohesion ships. Similarly, hostile work environments likely reduce motivation and distract sailors from tasks.

Limitations

We emphasize four limitations of our study. First, the sample size of 45 ships was small. Research with much larger samples is critical to further this area of study and increase confidence in the observed effects.

Second, the low ICC(1) values indicate relatively low between-unit variance in both cohesion and hostile work environment. As noted by Hausknecht et al. (2009), ICC(1) values reflect non-zero group-level variance, and such low values are typical of field data (LeBreton & Senter, 2008). Scholars have noted that small effect sizes can have an important practical influence (Aguinis, Beaty, Boik, & Pierce, 2005). Moreover, the $r_{WG(J)}$ values using a rectangular null distribution indicated within-group agreement for hostile work environment approaching agreement for cohesion, and the ICC(2) values suggested that the means are relatively stable. However, we emphasize the low ICC(1) values and urge caution in the application of our results until these findings have been replicated using larger samples across additional military services as well as civilian organizations.

Third, representativeness is a possible issue. We were able to assess the response rate across all ships but unable to assess the representativeness of the sample at the ship level. Accordingly, we emphasize that missing sailor data might have biased our results, and we encourage future researchers to make efforts to collect response rate data from each unit whenever possible.

Fourth, the items assessed cohesion at the workgroup level, and we aggregated scores at the ship level. As our samples were large, it is unlikely that all of the respondents were necessarily thinking of the ship, per se, in responding to items. Moreover, we did not specify work group or ship, per se, in assessing hostile work environment. Whereas we found significant effects, we urge caution in interpreting these results until aggregation operationalized at the appropriate levels have replicated the observed effects.

Implications and Future Research

Anecdotally, cohesion has long been considered important to military mission readiness, and human resources and legal officials have traditionally called for increasing efforts to minimize levels of hostile work environments. With the present study, we empirically demonstrated that both unit cohesion and hostile work environments have an impact on ship performance. This finding reinforces the position that commanders pay particular attention to issues that affect the development of cohesion and a hostile work environment. Clearly, these two facets of the command climate matter. We encourage future researchers to not only replicate our findings but also apply a multidimensional approach to cohesion and assess the links of cohesion and hostile work environments with a variety of unit levels of performance (e.g., re-enlistment rates, safety reports) across the services.

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Table 1

Descriptive Statistics, Alpha Reliabilities, and Correlation Matrix

| Variable | Mean | SD | 1 | 2 |
|-----------------------------|------|-----|--------|--------|
| 1. Cohesion | 3.74 | .14 | (.78) | |
| 2. Hostile work environment | 1.97 | .14 | -.66** | (.81) |
| 3. Ship performance | 0.91 | .76 | .39** | -.47** |

Note. $N = 45$ Naval ships. Scores presented reflected mean scores aggregated at the ship level. Internal consistency (α) reliability estimates derived at the individual level are displayed in the diagonal. * $p < .05$; ** $p < .01$.

Table 2. *Hierarchical Moderated Multiple Regression Results Predicting Ship Performance*

| Predictors | Total R^2 | ΔR^2 | β |
|-------------------------------------|-------------|--------------|---------|
| <i>Step 1:</i> | .15** | -- | |
| Cohesion | | | 2.10** |
| <i>Step 2:</i> | .23* | .08* | |
| Cohesion | | | .76 |
| Hostile work environment | | | -1.98* |
| <i>Step 3:</i> | .23 | .00 | |
| Cohesion | | | .76 |
| Hostile work environment | | | -2.08 |
| Cohesion x hostile work environment | | | 2.60 |

Note. * $p < .05$; ** $p < .01$.