

SELF-LEADERSHIP STRATEGIES & PERFORMANCE PERSPECTIVES WITHIN STUDENT AVIATION TEAMS

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This study uses a correlational-design to explore relationships between peer ratings of team member effectiveness, supervisor ratings of performance, and self-reported performance strategies associated with self-leadership. Team members that were perceived as effective by their peers were also favorably rated on job performance by their supervisors. Peer-ratings on possession of job-relevant knowledge, skills, and abilities increased with frequency of communication behaviors, as rated by supervisors. This finding replicates previous research that suggests talking leads to perceived expertise in teams. Finally, self-goal setting was found to be related to peer-rated teammate effectiveness, but not supervisor-rated performance.

Organization-level outcomes may be contingent upon individual-level performance strategies (Krokos, Baker, Alonso, & Day, 2009). As a normative theory, self-leadership strategies may be able to prescribe behaviors to individuals that would improve personal effectiveness at work (Andressen, Konradt, & Neck, 2011). Self-leadership entails both proactive behaviors and thought processes geared towards engineering productive and positive affective experiences. Bligh, Pearce, and Kohles (2006) suggest member-to-member interactions may be improved through individual cognitive-behavioral strategies associated with self-leadership, which may lead to overall enhanced team efficacy, trust, and commitment to the team. Still, supervisors perceive team behaviors differently than peers (Murphy & Cleveland, 1991). For example, talking may lead to perceived competence by team members (Littlepage, Schmidt, Whisler, & Frost, 1995); however, talking may not lead to increased job performance on individual taskwork or job duties. The aim of the present study is to explore the relationship between performance strategies, observer-rated individual performance, and perceived team member effectiveness in an aviation team work setting. The study will provide a comparison of the perspectives of work-role performance on various dimensions using a correlational-design.

Methodology

All participants ($N = 216$) were students enrolled in a southern university's Aerospace Seminar. Data was collected from participants enrolled between the Fall semester 2013 to Fall semester 2016. Participation in the lab portion of the class is required for graduation; however, participation in the research portion was voluntary. Institutional Review Board approval and informed consent were obtained before commencing data collection. Participants were assigned to teams of approximately 10 by the instructor of the aerospace seminar according to their major concentration within the aerospace program. Data from a total of 33 teams are included.

Each team completes a minimum of three 3-hour iterations in the lab during the course of the academic semester. The lab portion of the seminar incorporates multiple software

components and technologies to simulate a regional flight dispatch center, the Flight Operations Center – Unified Simulation (FOCUS; see Littlepage, Hein, Moffett, Craig, & Georgiou, 2016). Dispatching flights within the lab requires coordination and information sharing from every student position. The positions held by students include: flight operations coordinator (FOC), weather and forecasting (WX), crew scheduling (CS), flight operations data - scheduling (FOD1), flight operations data - planning (FOD2), and maintenance (MX). Data from other student positions were not included in this study, namely pilots and ramp tower coordinators.

Measures

Abbreviated Self-Leadership Questionnaire (ASLQ). The ASLQ is a nine item scale published by Houghton and his colleagues (2012). Self-leadership is assessed using three 3-item subscales, each subscale is associated with performance strategies subsumed under self-leadership: behavior awareness and volition, constructive cognition, and task motivation. Lab participants self-reported on the ASLQ using a 5-point Likert scale from 1 (*rarely*) to 5 (*usually*) during the final class meeting of the semester.

Behaviorally-Anchored Comprehensive Assessment of Team Member Effectiveness (CATME-B). Each lab participant rates his or her team members (i.e., peers) using the CATME-B (Ohland et al., 2012) on a scale from 1 (*below average*) to 5 (*excellent*). Team members did not rate themselves because self-ratings tend to be overly biased (Holzbach, 1978), especially for poor-performers (Murphy & Cleveland, 1991). Each team member is rated by his or her peers using three dimensions: *contributions to the team's work*, *teammate interaction*, and *possession of related knowledge, skills, and abilities (KSAs)*.

Individual Performance Measures (IPMs). A series of scales developed within the FOCUS lab were used to assess individual performance. Scales differ by student position and were created through the process of task analysis, in which essential work-role behaviors were identified for each position. Each scale contains three items related to communication that remain the same across positions; however, all other items are unique to the taskwork required by each respective position. A different subject matter expert, acting as a supervisor, rated each position on how often a participant engaged in work-role behaviors during the third simulation on a Likert-scale from 1 (*never*) to 7 (*always*).

Results

See Table 1 for descriptive statistics. The IPMs demonstrated acceptable levels of internal consistency, FOC ($\alpha = .95$), WX ($\alpha = .93$), CS ($\alpha = .96$), FOD1 ($\alpha = .88$), FOD2 ($\alpha = .89$), and MX ($\alpha = .93$). Confirmatory factor analysis (CFA) on each IPM provided support for a correlated two-factor model: *taskwork* and *communication*. The ASLQ did not have acceptable levels of internal consistency, further the CFA failed to support a one-factor model, $\chi^2(27, n = 85) = 48.82, p = .006, CFI = .88, TLI = .83, \text{ and } RMSEA = .10$. Therefore, the individual ASLQ items associated with specific strategies were used when calculating correlations. An index of within-team agreement (r_{wg}) was calculated on each CATME-B item. See Table 2 for average within-team agreement per item and per position. On average, teams agreed the most on their members' possession of KSAs ($r_{wg} = .75$), and across all items teams agreed the most on the

effectiveness of the maintenance position ($r_{wg} = .79$). Average scores for each participant on the ASLQ, IPMs, and CATME-B and their respective subscales were used to calculate correlations.

Table 1.
Descriptive Statistics

Measure	<i>n</i>	Min	Max	<i>M</i>	<i>SD</i>	Range
Individual Performance	181	1.78	7.00	5.29	0.99	8 - 10 ¹
Task-work	181	1.33	7.00	5.29	1.05	1 - 7 ¹
Communication	181	1.00	7.00	5.30	1.04	1 - 3
Team Member Effectiveness	198	2.50	5.00	4.26	0.49	1 - 3
Contributions to the Team's Work	198	1.00	5.00	4.00	1.09	1
Teammate Interaction	198	2.50	5.00	4.37	0.47	1
Possession of KSAs	198	2.50	5.00	4.41	0.46	1

Note. ¹ = Scales for task-work behaviors in the individual performance measures varied in size across position, ranging from 5 items to 7 items.

The self-goal setting item of the ASLQ was positively correlated with perceived team member effectiveness as rated by his or her peers on both contributing to teammate interaction ($n = 51, r = .30, p = .032$) and to the team's work ($n = 51, r = .28, p = .045$), but not with supervisor ratings of performance. No other self-leadership performance strategy measured in this study was correlated with any performance outcomes. See Table 3 for all other correlations.

Table 2.
Average Within-Team Agreement (r_{wg}) for Peer-Rated Teammate Effectiveness

CATME-B Dimension	Position						Average/Item
	FOC	FOD1	FOD2	CS	WX	MX	
Team's Work	0.78	0.78	0.74	0.71	0.70	0.76	0.74
Teammate Interaction	0.75	0.71	0.72	0.76	0.68	0.79	0.73
Possession of KSAs	0.78	0.72	0.73	0.73	0.75	0.83	0.75
Average/Position	0.77	0.73	0.73	0.73	0.71	0.79	

Note. $N = 33$ teams. CATME-B = Behaviorally-anchored comprehensive assessment of team member effectiveness; FOC = Flight operations coordinator; FOD1 = Flight operations - scheduling; FOD2 = Flight operations - weight & balance; CS = Crew scheduling; WX = Weather & Forecasting; MX = Maintenance control. Team-level r_{wg} Min = .00 Max = 1.00.

While individual performance was moderately correlated with team member effectiveness ($r = .31, p < .001$), contributions to teammate interaction was only correlated with the communication subscale of individual performance ($r = .19, p = .010$). Further, teammate

interaction was strongly correlated with possession of KSAs ($r = .75, p < .001$), while possession of KSAs was moderately correlated with the IPM subscale of communication ($r = .29, p < .001$).

Table 3
Correlations Between Performance Dimensions

Measure	1	2	3	4	5	6	7
1. Individual Performance ¹	1						
2. Taskwork	.97*	1					
3. Communication	.90*	.77*	1				
4. Team Member Effectiveness ²	.31*	.31*	.27*	1			
5. Contributions to the Team's Work	.26*	.28*	.16 [‡]	.81*	1		
6. Teammate Interaction	.13	.09	.19*	.61*	.08 [‡]	1	
7. Possession of KSAs	.25*	.22*	.29*	.68*	.17 [‡]	.75*	1

Note. * = Correlation is significant at the .01 level (2-tailed); [‡] = Correlation is significant at the .05 level (2-tailed). ¹ = Ratings provided by lab researchers acting as job supervisors. ² = Ratings provided by peers on the same team as the participant.

Discussion

Self-goal setting is a performance strategy that was found to be related to teammate perceptions of effectiveness. Other performance strategies that comprised the *constructive cognition* and *task motivation* dimensions, including self-observation, visualizing successful performance, self-reward, self-talk, and evaluating beliefs and assumptions, were not related to peer-perceived effectiveness or supervisor-rated performance. The strategies measured may not generalize to the aviation industry or perhaps only the specific research setting. Another explanation is that the items did not adequately capture these strategies.

Members of the student teams generally shared an acceptable level of consensus on member effectiveness across the three dimensions: *contributing to the team's work*, *contributing to the team's interaction*, and *possession of KSAs*. Teams shared the strongest level of agreement on the effectiveness of the flight dispatcher (FOC) and the maintenance control position, and the weakest level of agreement on the effectiveness of the weather and forecasting position. In other words, the participants generally agreed on the level of KSAs, contributions to the team's work, and contributions to the team's interaction of their peers within the lab.

On average, as team members were rated more favorably by their supervisor on job-related tasks and communication behaviors, such as the sharing and solicitation of information and coordination, they were also perceived as more effective by their peers. Further, team members seen by their peers as contributing to the team's work, were seen by supervisors as engaging in job-related tasks and behaviors. Team members perceived by their peers as contributing to team interaction through feedback seeking and providing encouragement, were also favorably rated by a supervisor on frequency of communication behaviors, but not on

performing job-specific duties. Interestingly, as team members engaged in communication behaviors more frequently, they were perceived by their teammates as possessing superior knowledge, skills, abilities.

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