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Emotional Intelligence and Safety Citizenship among Army aviators

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Emotional Intelligence and Safety Citizenship among Army aviators

Cover Page Footnote

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Powered flight, by its very nature, retains inherent risks for pilots and passengers alike. Despite the modern technological improvements, over 340 fatalities occurred in the United States in 2017 (Federal Aviation Administration [FAA], 2018). Studies have shown that between 60-80% percent of all aviation incidents are caused by human error (Shappell et al., 2006). As such, it is imperative that pilots have an appropriate attitude towards risk and avoid the hazardous attitudes of complacency, indiscipline, and overconfidence that often lead to increased rates of human error (FAA, 2013). A pilot's willingness to accept risk and/or place the aircraft in hazardous situations have a significant impact on the overall safety of the flight crew (Hunter, 2002; O'Hare, 1990). This is particularly true within the realm of military aviation where pilots operate in complex environments with increased individual workloads due to mission scope (Harding & Goosey, 2019).

Developed under the constructs of organizational citizenship behavior, Safety Citizenship (SC) is defined as the "behaviors that are discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promote the effective functioning of the organization" (Didla et al., 2009). SC activities are focused on the improved safety performance of others and the organization as a whole (Hofmann et al., 2003). SC has been associated with behaviors such as taking initiative to improve safety policy and volunteering for safety programs or activities (Finley et al., 2015). Therefore, in an aviation context, pilots with a high SC orientation may be more actively concerned with the well-being of their fellow crewmembers. It is crucial that pilots accurately understand the associated risks and act in ways that promote the well-being of their fellow crewmembers to maintain flight safety.

Emotional Intelligence (EI) encompasses an array of traits and self-perceived abilities that relate to an individual's ability to engage others socially (Petrides & Furnham, 2001). Over the past three decades, EI has been associated with success in numerous fields including job satisfaction (Jorfi et al., 2012), mental toughness (Cowden, 2016), and even stroke recovery (Hoffman et al., 2010). As of yet, little has been done to specifically understand how EI relates to SC, but studies have linked EI with safety (Arnau-Sabatés et al., 2012; Lu & Kuo, 2016) and other aspects of citizenship participation such as organizational citizenship behavior (Chin et al., 2011; Ng et al., 2014).

To the authors' knowledge, no research has been conducted to evaluate the relationship between military aviators' EI and SC. However, research has demonstrated a relationship between EI and organizational citizenship behaviors (Ahmadzadeh Mashinchi, 2011; Chin et al., 2011; Ng et al., 2014) For instance, Ng et al. (2014) concluded that EI was closely associated with organizational citizenship behaviors among nurses, while Chin et al. (2011) determined that EI "had a positive and significant relationship with the dimensions of organizational

citizenship behavior” within manufacturing sectors. These results seem to indicate the possibility of a positive relationship between EI and SC as well.

Using the understanding of EI as a “as a personality trait at the lower levels of personality taxonomies” (Petrides et al., 2007) additional past research findings may be applied that have linked personality traits to safety-related attitudes within motor traffic safety (Chen, 2009; Ulleberg & Rundmo, 2003). This research seeks to investigate the relationship between EI and SC among Army aviators to better understand how EI associates with an individual’s SC related behavior. A secondary outcome was to determine what facets of EI are most closely related to SC behaviors.

Methods

Participants

Twenty-nine (29) United States Army aviators from two Army aviation battalions were participants in this study. Pilots from a representative range of experience were selected to participate (150-5000+ hrs) Participants were between 24 and 44 years old ($\bar{x} = 32.6$, $s = 5.1$). Of the participants, the majority were male (96.6%). The survey included both fixed-wing, airplane ($n = 20$) and rotary-wing, helicopter ($n = 9$) pilots. Participants were generally white (89.7%), married (82.8%), and had completed at least some college (96.6%) (Table 1).

Table 1
Participant Descriptive Statistics (n=29)

Characteristic	Frequency (n)	Proportion (%)	Cumulative (%)
Age	24-30	11	37.9%
	31-37	13	44.8%
	38-44	5	17.2%
Gender	Male	28	96.6%
	Female	1	3.4%
Race	White	26	89.7%
	Other ¹	3	10.3%
Marital Status	Single	2	6.9%
	Married	24	82.8%
	Divorced/Separated	3	10.3%
Education Level	Associate's Degree or less	3	10.3%
	Some College	11	37.9%
	Bachelor's Degree	12	41.4%
	Master's Degree	3	10.3%
Aircraft Type	Rotary-Wing	9	31.0%
	Fixed-Wing	20	69.0%
Flight Time	0-200 hrs	2	6.9%
	200-500hrs	7	24.1%
	500-1000 hrs	5	17.2%
	1000-2000 hrs	8	27.6%
	2000+ hrs	7	24.1%
Pilot in Command	Yes	18	62.1%
	No	11	37.9%

Note. 1 Includes persons of Black/African American, Hispanic/Latin/Spanish, Native American, or undisclosed race or ethnicity.

Assessments

Demographic Characteristics Questionnaire

This portion of the survey consisted of 14 items for the collection of specific individual data such as age, gender, marital status, educational level, flight time, etc. (Table 1).

Trait Emotional Intelligence (TEIQue)

TEIQue is a widely utilized and validated tool used to evaluate an individual's trait EI (Petrides & Furnham, 2003). This questionnaire is composed of 153 items that evaluate an individual's EI based upon the four factors and 15 facets. This serves as a self-assessment metric and is composed of verbally-anchored 7-point Likert-scale type questions (ranging from "1= Completely Disagree" to "7= Completely Agree").

Safety Citizenship

Willis et al. (2012) developed this survey metric as a 22-item questionnaire to assess individual perception of personal SC as well as organizational safety climate, and occupational unsafe event exposure. For the purposes of this study, the survey instrument only utilized eight (8) SC related items were used assess aviator SC. The items are formatted using a similar 7-point Likert scale from “1= Strongly Disagree” to “7= Strongly Agree”.

Data Collection Process

The assessment metrics were compiled together as one survey tool using Qualtrics^{®XM} Online Survey Software (Qualtrics, Provo, UT). The survey was distributed to Army aviators at two separate military installations located in the continental United States. Participants were informed about the specifics of the research study and were made aware of the anonymous nature of their participation. Every participant provided signed informed consent as approved by the institutional review board.

Statistical Analysis

All survey responses were compiled and exported for further analysis. The TEIQue questionnaire responses were evaluated using the online scoring program provided by the London Psychometrics Laboratory (LPL) at psychometriclab.com (accessed 2020, LPL, London, UK). This provided detailed scores for each aviator for all EI factors, facets, and the combined global EI scores. The SC survey responses were evaluated using a simple summation of each aviator’s responses. Minitab[®] (v19, Minitab, LLC, State College, PA) was used for all analysis. For simple linear regression, the independent variable was the global EI score and the dependent variable was SC. After simple linear regression, the data were evaluated using stepwise backward elimination multiple linear regression, which included the 15 EI facets as independent variables. The level of significance was set at alpha = 0.05.

Results

Total EI accounted for 34.04% of the variability in SC when using simple linear regression (Table 4). The resulting regression equation was:

$$SC = -17 + 11.25 \text{ Global EI} \quad \text{Eq. 1}$$

Using this, every unit increase of EI total score resulted in a 11.25 unit increase in individual SC. This model was significant with ($p = 0.001$, Table 2).

The stepwise regression analysis of the data showed that the model with SC as the dependent variable and EI facets as the independent variables accounted for 49.65% of the variation in SC. The resulting regression equation was:

$$SC = -5.3 + 7.92 \text{ Self Esteem} - 8.83 \text{ Optimism} + 12.09 \text{ Adaptability} \quad \text{Eq. 2}$$

This equation indicated a positive association between SC and *Self Esteem* ($\beta = 7.92$) and *Adaptability* ($\beta = 12.09$) but a negative association between SC and *Optimism* ($\beta = -8.83$). The independent variables were significant with *Adaptability* ($p < 0.001$), *Optimism* ($p = 0.007$), and *Self Esteem* ($p = 0.003$).

Table 2
Simple Linear and Stepwise Regression Results

Regression	Variable	β	F- Value	P-Value	S	Adj. R ²
Simple Linear	Global EI	11.25	F (1,28) = 15.45	0.001	7.84	0.3404
Stepwise Multiple Linear	Self Esteem	7.92	F (1, 25) = 10.75	0.003	7.84	0.4965
	Optimism	-8.83	F (1, 25) = 8.71	0.007		
	Adaptability	12.09	F (1,25) = 23.91	< 0.001		

Discussion

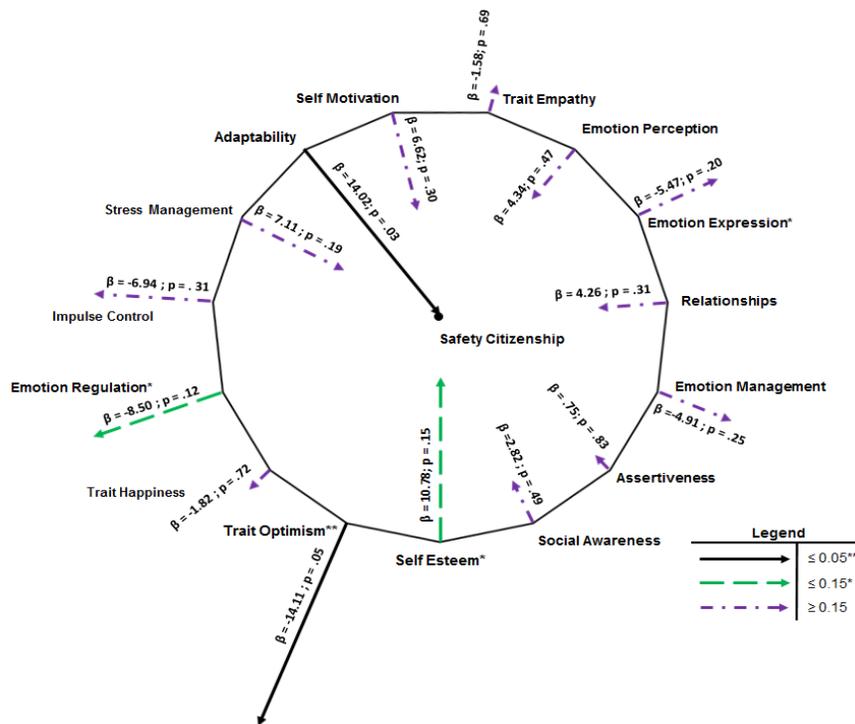
The purpose of this study was to investigate the relationship between SC and EI to better understand if EI contributed to an individual Army aviator's SC. In particular, the goal was to determine if an aviator's TEIQue could influence his/her SC behavior. The results indicated a positive association between global EI score and SC ($p = 0.001$), demonstrating that EI can be used to predict SC. Practically, this means that individuals with higher global EI scores would have a higher SC. These findings align with Lu and Kuo (2016) who found that EI has a positive association with safety behaviors; suggesting that high EI would generate higher safety standards. Arnau-Sabatés et al. (2012) noted a similar relationship between EI and risk taking behavior among vehicle drivers, with high EI limiting a person's propensity to engage in risky behavior.

Similarly, the results indicated a positive relationship between SC and both *Adaptability* ($\beta = 12.09$) and *Self Esteem* ($\beta = 7.92$), but a negative relationship with *Optimism* ($\beta = -8.83$). Pilots with higher levels of *Self Esteem* and *Adaptability* seemed to be more inclined to pursue SC related behaviors, while those with high *Optimism* scores did not.

To further understand the impact of all 15 EI facets, a multiple linear regression was conducted without elimination of non-significant factors. This indicated that *Adaptability* ($\beta = 14.02$; $p = 0.03$) and *Optimism* ($\beta = -14.11$; $p = 0.05$) were most significant (Figure 1). Marginally significant facets were *Emotion Regulation* ($\beta = -8.50$; $p = 0.12$) and *Self Esteem* ($\beta = 10.78$; $p = 0.15$). *Adaptability* consistently appeared to have the highest positive association with SC which is consistent with previous research that has noted a similar relationship between

individual adaptability and performance, particularly in jobs with higher stress and/or complexity (Bernard, 2018; Pulakos et al., 2000). Yet, no research has evaluated the relationship between EI facets and SC related behaviors as was done in this study.

Figure 1
Regression Coefficients (β -value) Compared Across all 15 EI Facets



Of note, further analysis indicated that aviators with more than 1000-hrs of flight time scored higher on the SC behaviors questionnaire. Likewise, individuals who identified as Pilot in Command (PC) indicated higher SC scores than non-pilot in command individuals. This seems to indicate that persons with higher levels of responsibility are more inclined to present SC related tendencies. This aligns with the findings of Ng et al. (2014) who found that work locus of control, or the degree in which one feels in control of their work environment, appeared to relate to organizational citizenship behaviors and EI among nurses.

The results of this study clearly indicated a relationship between EI and SC among Army aviators. This has potentially important implications for efforts to increase safety in aviation organizations. For example, improved understanding of how *Adaptability* and *Self Esteem* impact pilot safety citizenship behaviors could

lead to key improvements in the pilot selection process through improved screening metrics. Likewise, further knowledge of EI's relationship to safety citizenship behaviors could generate improvements in pilot training focused on increasing EI traits that benefit SC behaviors while decreasing individual trait tendencies that limit individual safety citizenship behaviors.

The present research has a limited sample size composed of a specific subgroup of Army pilots. Military pilots generally receive more training and annual flight hours than most of their general aviation counterparts (Shappell & Wiegmann, 2004) and, therefore, may not accurately represent the entirety of the aviation community. Future analysis of a larger pilot population including general aviation and commercial pilots should be conducted to further investigate the relationship between EI and SC within the greater aviation community. The results of the study indicate that *Optimism* has a negative association with SC. Future studies should evaluate this relationship in order to understand why *Optimism* might be negatively associated with safety citizenship in Army aviators. Finally, future research should evaluate training methods focused on improving individual *Adaptability* and *Self-Esteem* for implementation in an aviation context.

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