Upward Safety Communication and Safety Behavior of Cabin Crew

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Abstract： To enhance air travel safety and alleviate tourism concern, cabin crew is critical to the cabin safety performance of airlines yet has received limited research attention. This paper aims to develop an integrated model to explore the effects of tri-dimensional indicators, namely, organizational, group and individual factors, on cabin crew's safety behavior, with upward safety communication serving as the mediator. Data from 296 flight attendants working for the major Taiwanese international airlines reveal that cabin crew's positive perceptions of their airline's Safety Management System performance, department managers' benevolent leadership and core self-evaluations may directly lead to flight attendants' willingness to carry out upward safety communication, which has a direct and significant effect on the in-role and extra-role safety behavior of cabin crews. The theoretical and practical implications of the findings are discussed in detail and directions for future research are identified.

Keywords: Cabin crew; Safety behavior; Upward safety communication; Safety Management System; Benevolent leadership; Core self-evaluations

1. INTRODUCTION

Cabin crew members are primarily trained to implement cabin safety policies, and thus ensure safety on board. However, in most Asian countries, including Taiwan, cabin crew is widely seen as service workers and salespersons (Liang and Hsieh, 2005), and thus their professionalism in handling abnormal and emergency situations tends to be underestimated. The cabin crew serves as the liaison between the cockpit, cabin and ground (Chen and Chen, 2012a), and communication has thus been long recognized as the essential element in the good performance of cabin crew duties. During flights, the primary job of the cabin crew is to ensure that all safety regulations are followed (Kao *et al.*, 2009), and they are also obligated to proactively prevent any emergencies that may be caused by human error or unruly passengers. Although this safety responsibility outweighs other cabin duties, such as serving drinks and meals, only recently have issues related to cabin crew safety behavior and safety role begun to receive research attention (Rhoden *et al.*, 2008; Simpson *et al.*, 2004).

Hufmann and Morgeson (1999) propose that upward safety communication is closely related to the avoidance of adverse safety events. Moreover, it is widely recognized that employee reports of accidents, errors, near misses, and other operational problems are valuable to managers, as they can provide information that is unavailable elsewhere, producing opportunities

to correct unsafe situations and improve work systems (Hogan *et al.*, 2008). It is hence expected that the more cabin crews are willing to conduct upward safety communication, the better the understanding shared between flight attendants and managers is, thus improving safety performance.

In practice, cabin safety requires more than flight attendants' reactive behavior to cope with the variety of incidents and accidents that may occur in flight, and proactive attitude toward teamwork and promoting safety concepts are considered critical to enhancing safety performance. Cabin crews' passive and proactive safety behaviors are analogous to in-role and extra-role behaviors, which have been widely examined in the organizational citizenship behavior literature (Fugas *et al.*, 2012; Podsakoff *et al.*, 2000). In-role safety behavior describes flight attendants' compliance with the safety policies and regulations issued by aviation authorities and airlines, and this is also known as safety compliance (Borman and Motowidlo, 1993; Griffin and Neal, 2000). Extra-role safety behavior refers to cabin crew members using their initiative to carry out actions that go beyond their job descriptions to enhance safety performance. Safety participation (Griffin and Neal, 2000), or proactive safety behavior (Fugas et al., 2012), are similar concepts to extra-role safety behavior. Since it is always necessary to improve safety performance, it would thus be very useful for airlines to learn how to motivate the safety behavior of cabin crews within their existing organizational contexts.

It is widely accepted that people's behavior stems from their personal knowledge and values, as well as from the group norms and organizational cultures that they operate within (Bill, 2003). Cabin crews' safety behavior may thus be viewed as the result of a chain of social influence that combines individual, group and organizational attributes. However, previous research that aims to identify the antecedents of safety behavior has by and large focused on these organizational, group or individual aspects separately (Barling *et al.*, 2002; Cooper and Phillips, 2004). Therefore, the current study aims to develop an integrated model to simultaneously link cabin crews' upward safety communication and safety behavior with tri-dimensional factors representing organizational, group and individual factors.

In the conceptual model, how cabin crews perceive their airlines' Safety Management System (SMS) performance is selected to present the organizational factor. In recent years, airlines have relied on the practice of an SMS to integrate safety policies and augment safety performance at both organizational and individual levels (Chen and Chen, 2012b). It is thus logical to describe the employees' assessment of SMS performance as the embodiment of how they perceive their airlines' safety climate, and a number of studies have applied safety climate to determine the effects on employees' safety behavior (e.g. Cooper and Phillips, 2004; Fogarty and Shaw, 2010). Department managers' benevolent leadership is adopted as the group level factor. Benevolent leadership is a sub-construct of paternalistic leadership, which has been widely observed in Chinese business organizations, as it conforms to the mores of Chinese culture and has been shown to enhance employees' effectiveness to a greater degree than transformational leadership in Chinese context (Chou *et al.*, 2005). It is thus of interest to examine whether benevolent leadership may generate similar positive effects on cabin crews' safety behavior. As for the individual factor, a higher order construct which consists of self-esteem, locus of control, neuroticism (or emotional stability), and generalized self-efficacy, known as the core self-evaluations (CSE), is applied to explore its predictive power with regard to cabin crew's safety related behavior. People with high CSE are assumed to have positive self identification and achieve better performance (Erez and Judge, 2001; Judge and Hurst, 2007). Working in the sky, cabin crews need to carry out many tasks and remain emotional stable, and thus it is expected that

flight attendants with high CSE are more self-motivated to conduct in-role and extra-role safety behaviors.

2. THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

2.1.Upward Safety Communication and Safety Behavior

Over the last decade, the concept of safety communication has been broadly adopted in research measuring the safety climate in various industries (e.g. Cigularov *et al.*, 2010; Mearns *et al.*, 2003). Safety communication assesses how free and open employees feel about raising their concerns and discussing safety related issues (Hofmann and Stetzer, 1998). More specifically, upward safety communication refers to subordinates taking the initiative to express concerns or propose recommendations about safety related issues to their managers (Hofmann and Morgeson, 1999; Kath *et al.*, 2010). It not only reflects whether companies provide a working environment that encourages communication, but also indicates how much employees value safety at work.

The Flight Attendant Manual Standard issued by Transport Canada (1996), indicates that it is the cabin crew's responsibility to communicate any on-board safety concerns they may have or that may be communicated to them by a passenger to the captain. While the duties and functions assigned to flight attendants in the interests of cabin safety are well established across the aviation industry, how the cabin crew perceives their own safety related behavior and what are the potential antecedents which may be attributed to it have received relatively little attention by researchers.

Smith *et al*. (1978) indicate that open communication and frequent interactions between employees and managers are important factors that can lead to low accident rates. Working at the frontline, flight attendants possess abundant opportunities to learn not only from the company's training programs, but also from interacting with passengers and other professional crew members, such as pilots and maintenance staff. Due to regard to the multi-functional roles, multi-tasking and teamwork which cabin crews need to perform on-board (Chen and Chen, 2012a), good communication has long been recognized as one of the key job requirements of flight attendants. Working as frontline employees, flight attendants can easily observe the effects of company policy with regard to cabin safety, and also collect feedback from passengers. Cabin crews' willingness to conduct upward safety communication reflects the degree to which they perceive cabin safety performance as being important, and how much effort they are willing to devote to achieving it. Airlines can benefit significantly if the valuable information that cabin crew possess is used effectively and efficiently. It is also asserted that employee enthusiasm to conduct upward safety communication has a positive impact on reducing occupational accidents and near-misses (Mearns et al., 1998; Probst, 2004). Based on these earlier studies, it is proposed that observing cabin crews' upward safety communication behavior may help to better comprehend cabin safety performance at both the individual and organizational levels.

At the individual level, prior studies have proposed that safety communication is closely associated with employees' safety behavior (Cigularov *et al.*, 2010; Griffin and Neal, 2000; Parker *et al.*, 2001), and this behavior has attracted increasing attention with regard to the human factors that are involved in work-related accidents (Fogarty and Shaw, 2010; Mullen, 2004; Neal and Griffin, 2006). Individuals develop a sense of job role on the basis of what they think that they are supposed to do or prefer to do (Graen, 1976), and a similar development process occurs with regard to the performance of safety behavior. Hofmann *et al.* (2003) extend the concept of

role orientation to the occupational safety domain, and define the citizenship behaviors that are related to workplace safety as safety citizenship role. Based on the concept of organizational citizenship behavior (Pdosakoff *et al.*, 2000; Organ, 1988), which differentiates in-role (part of the role) behavior from extra-role (beyond the role) behavior, safety behavior may also be recognized as consisting of two categories of performance, compliance safety behavior and proactive safety behavior (Fugas *et al.*, 2012).

Compliance safety behavior refers to correctly using protective equipment, abiding by safety policies and properly performing procedures to reduce the risk of potential hazards and injury, and this is part of the work role that cabin crews are trained to practice. However, Didla *et al.* (2009) argue that employee compliance with safety rules may only passively prevent accidents caused by violations, and suggest that the continuous improvement of safety performance requires employees to proactively participate in safety activities. As for cabin crew, putting in extra effort to promote safety concepts in the off-hours is regarded as proactive safety behavior, and may also be seen as extra-role behavior which is focused on safety. This bi-dimensional safety behavior approach is consistent with the theoretical trend led by Griffin and Neal (2000), who differentiate safety behavior into two types: safety compliance and safety participation. Safety compliance indicates the fundamental behaviors practiced by the employees to ensure personal and workplace safety. Safety participation refers to the behaviors which help develop a safety-supportive environment, instead of only working to guarantee personal safety.

Flight attendants with stronger willingness to conduct upward safety communication are assumed to more actively comply with safety rules and participate in safety activities, and be more likely to take initiative to express their safety-related opinions. This research thus proposes the following hypothesis:

H1. Cabin crew's upward safety communication behavior is positively associated with their compliance and proactive safety behaviors.

2.2.Perceived SMS Performance

A cabin crew's perception of their airline's SMS performance is adopted as the indicator of the organizational safety in this study. SMS highlights the integration of the entire organization serving as one team, following principles that are laid down at the top to proactively manage safety (Chen and Chen, 2012b). The Federal Aviation Administration (FAA) describes SMS as a quality management approach to controlling risk, which also provides the organizational framework needed to support a safety culture (FAA, 2006). An SMS is also regarded as a methodology by which a company manages safety throughout the organization, utilizing a systematic approach to ensure that all parts of its business are addressed and that all risks are identified and subsequently managed (UKCAA, 2002).

SMS is developed on the basis of existing safety theories and models, and it acts as a coordinated, comprehensive set of processes designed to direct all accessible resources to manage safety in an optimal manner (Transport Canada, 2008). It is believed that airlines' SMS performance positively impacts cabin crews' upward safety communication and safety behavior, as the ultimate aim of SMS in the airline industry is to establish an effective aviation safety culture, which can detect and correct safety related problems prior to an accident occurring (Lewis, 2008). A successful SMS requires airlines to motivate all employees to proactive participating in and promoting safety activities. If a cabin crew perceives their airline's SMS

performance in a positive manner, it is more likely that they will perform safety behavior proactively because they are part of the whole system.

Previous studies confirm the relationship between the implementation of SMS and the attitudes of employees towards safety related behaviors in aviation (e.g. Remawi *et al.*, 2011). Accordingly, this study predicts that the better a cabin crew perceives the SMS performance within their airline, the more they are willing to conduct upward safety communication, compliance and proactive safety behaviors. Since the direct effect which upward safety communication may have on cabin crew's safety behavior is hypothesized, its mediating effects between cabin crew's perceived SMS performance and two types of safety behavior are both examined. The following hypotheses are thus proposed:

H2. A cabin crew's perception of airline SMS performance is positively associated with their upward safety communication.

H3. A cabin crew's perception of airline SMS performance is positively associated with their compliance and proactive safety behaviors.

H4. A cabin crew's upward safety communication mediates the relationship between their perceptions of airline SMS performance and their compliance and proactive safety behaviors.

2.3. Benevolent Leadership

Among the various factors that influence employee attitudes and behaviors, leadership is proposed to have very significant effects on them (Yukl, 2002). Leadership may be viewed as the process of influencing others towards achieving a desired outcome inside a group. Research on leadership has adopted various different perspectives, among which how particular leadership styles affect employee behavior has attracted major attention (e.g. Kelloway and Barling, 2010; Detert and Burris, 2007). Clarke and Ward (2006) indicate that leadership style has a particularly significant impact on employees with regard to their safety participation. The causality between leadership and employee safety behaviors has been supported by a number of related studies (e.g. Hofmann and Morgeson, 1999; Yang *et al.*, 2009; Zohar and Luria, 2003). Likewise, this paper applies leadership style as the group aspect indicator to observe its relation to cabin crew's safety upward communication and safety behavior. However, different from previous research, instead of applying transformational leadership, which is commonly identified as a predictive variable in prior studies (Barling, *et al.*, 2002; Yang *et al.*, 2009; Zohar, 2002), the department manager's benevolent leadership is used in the current study to manifest the targeted population's Chinese cultural background. It is noted that in traditional Chinese societies leaders are expected to have a paternalistic role, with overtones of fatherly benevolence (Cheng *et al*., 2000; Pellegrini and Scandura, 2008). However, the benevolent leadership style has not yet been examined in the context of Taiwanese airlines, which can be seen as international organizations embedded in Chinese culture.

Benevolent leadership, which along with authoritarianism and morality is one of the three dimensions of paternalistic leadership style, refers to a leader who demonstrates individualized, holistic concern for his or her subordinates' well-being, both personal and familial (Cheng *et al.*, 2004; Farh and Cheng, 2000; Wang and Cheng, 2009). Benevolent leaders tend to act like parents and provide attentive care with regard to their followers' work and personal lives, with this care being accumulated in exchange for the subordinates' trust, loyalty and support. Prior research finds a consistent result that benevolent leadership in Chinese enterprises strongly enhances employee respect, gratitude and commitment with regard to their leaders (Cheng *et al.*, 2004;

Farh *et al.*, 2006). The positive effects of benevolent leadership is reflected in a variety of favorable work outcomes, such as job performance, organizational commitment and citizenship behavior (Erben and Gunerser, 2008; Farh *et al.*, 2008). However, the existing literature on this topic is marked by some limitations. One is the lack of attention paid to the causal relationship between benevolent leadership and employees' safety related performance. This leads to one of the primary goals of the current study, which aims to establish a theoretical basis for connecting managers' benevolent leadership and subordinates' safety behavior.

The leadership enacted by department managers is believed to have a significant influence on how cabin crew feel, think, and behave at work, as there is considerable evidence to support the causal link between leadership and the performance of subordinates (Barling *et al.*, 2002; Jong and Hartog, 2007). The nature of their work requires cabin crews to live with continuously changing schedules and the significant job demands associated with their physically, psychologically and emotionally taxing work can often lead to mental or physical health problems (Chen and Chen, 2012a; Heuven and Bakker, 2003). Furthermore, work-family conflict is found in the majority of flight attendants (Chen, 2006; Xanthopoulou *et al.*, 2008). Since they are frontline employees, cabin crews need to be fully supported by managers in order to work with less pressure and carry out their best performance on-board. The parental care and support expressed by benevolent leaders are thus expected to boost the cohesion among cabin crew members, and motivate them to work better as a team to achieve a shared vision.

Since benevolent leadership is positively related to employees' in-role and extra-role behaviors (Chen et al., 2011), this study aims to explore whether a similar linkage exists between benevolent leadership and a cabin crew's safety in-role and extra-role behavior, which are represented by upward safety communication, safety compliance and participation in the current paper. We hypothesize that a department manager's benevolent leadership may motivate the cabin crew to carry out enhanced safety behaviors, as stated in hypotheses 5 and 6. In addition, the mediating effect of upward communication in this causality path will also be tested and addressed in hypothesis 7.

H5. The department manager's benevolent leadership is positively associated with a cabin crew's upward safety communication.

H6. The department manager's benevolent leadership is positively associated with a cabin crew's compliance and proactive safety behaviors.

H7. A cabin crew's upward safety communication mediates the relationship between benevolent leadership and their compliance and proactive safety behaviors.

2.4. Core Self-evaluations (CSE)

The present study adopts core self-evaluations (CSE) as the individual-aspect predictor to examine how they affect cabin crew's safety behaviors. CSE is a higher order concept representing the fundamental evaluations that people have of themselves and their functioning in the environment (Judge *et al.*, 2003). Various different constructs, such as personality traits, emotional stability, self efficacy or self-esteem, are among the most commonly used focal antecedents which psychological studies apply to link with individual work outcomes (e.g. Barrick and Mount, 1991; Hogan, 1996; Judge et al., 2000; Wiggins, 1996). There are numerous references which supporting the argument that the aforementioned personal traits are highly intercorrelated, exhibiting strikingly similar relationships in various contexts (Bono and Judge, 2003; Francis, 1996; Roseberg, 1965). Accordingly, Judge *et al.* (1997) integrated four traits into

a valid psychological construct, and termed it "core self-evaluations", consisting of self-esteem, locus of control, neuroticism (or emotional stability), and generalized self-efficacy.

Judge *et al.* (1997) propose that core evaluations are individuals' fundamental, bottom-line evaluations which subconsciously affect their self-appraisals, and how they value the world and others. At a primary level, people with high-CSE are commonly characterized by feelings of self-confidence, self-worth, self-potency, and freedom from anxiety (Hiller and Hambrick, 2005). Similar to other personal traits, CSE has been adopted as a predictor to examine work performance. Job satisfaction and job performance are the two main criteria of interest to industry/organization psychologists regarding both their conceptual and empirical relationships with the CSE traits (Bono and Judge, 2003; Erez and Judge, 2001; Judge and Bono, 2001). Research has found that people with positive self-evaluations are not only more effective at overcoming obstacles by using better problem solving strategies, they also perform better in positions requiring positive interpersonal relations or stress tolerance (Bono and Judge, 2003).

Cabin crews work under tremendous stress due to a variety of passengers issues (such as unruly or demanding passengers) or unexpected situations (both service- and emergency-related) occurring on-board. However, the negative consequences of cabin work tend to be elided by the attractive job image and additional benefits, such as regular travel overseas. Indeed, demand for such job remains extremely high in Asia, even as the heavy demands of such work have gained increasing attention in the recent years, both practitioners and academics (Chen and Chen, 2012a; Liang and Hsieh, 2005). There is no doubt that work experience and support from manages and airlines are essential if flight attendants are to be able to cope with the pressures and uncertainties they face both at work and in their personal lives. Moreover, the significance of a flight attendant's personality should not be underestimated. Since good interpersonal skills and high stress tolerance are considered critical critical for this kind of work, people with high CSE are expected to do better as flight attendants.

The relation between core self-evaluations and job performance, including task performance and organizational citizenship behaviors (OCB), has been confirmed in a number of studies (Judge *et al.*, 1998; Piccolo *et al.*, 2005; Sheykhshabani, 2012). This paper intends to extend the linkage by examining whether cabin attendants' core self-evaluations predict their safety behaviors, and specifically their upward safety communication, compliance and proactive safety behaviors. While we consider cabin crews' safety behaviors as the organizational citizenship behaviors focusing on safety related performance, the results of this study may help indicate whether the existing causality between CSE and OCB still holds in the context of safety. Based on the proposal that cabin crews' upward safety communication serves as a mediator, the related hypotheses are as follows.

H8. A cabin crew's CSE is positively associated with their upward safety communication.
H9. A cabin crew's CSE is positively associated with their compliance and participation safety behaviors.
H10. A cabin crew's upward safety communication mediates the relationship between CSE and their compliance and proactive safety behavior.

3. METHOD

3.1.Participants and Procedures

The study population is the cabin crew who works for international airlines in Taiwan. Due to cabin crew's shifted work schedule, the paper-based survey was initially distributed through each airline's internal contact. Questionnaires with sealable stamped addressed envelopes were either deposited in the individual mailbox or distributed on board an aircraft. Data were collected during the three-month period from April to June, 2012. A total of 450 surveys were distributed. Three hundred and nine samples were returned, among which 296 ones were effective, representing an acceptable response rate of 66 %.

The majority of respondents are young women, with 91.6 % of the respondents being female, mostly aged ranged from 26 to 30 years old (42.9%). The respondents' years of tenure mainly fell into the ranges of one to five years (36.8%) and six to ten years (24%). Regarding the ranking, 72.3% of the samples were basic level flight attendants, and 8.4 % had a position as chief purser. 69.9 % of the respondents were single and 83.8% of the respondents had no children. The major range of flight time within the previous three months was between 71 and 80 hours.

3.2.Measures

The scales used to obtain the measures of the variables are described below. All items were rated on a seven-point Likert scale ranging from 1= *strongly disagree* to 7= *strongly agree.*

3.2.1. Perceived SMS performance

The scale consists of two sub-constructs, i.e. Policy and Practice, containing 17 items, based on the SMS performance evaluation scale developed by Chen and Chen (2012b). Cabin crew was asked to evaluate the performance of company's SMS by the level of agreement with a number of statements in this study. Sample items include: "The top management participates in SMS related activities" for Policy and "Employees periodically take training programs related to emergency preparedness and response plans" for Practice. The reliability coefficient values are 0.92 and 0.93 for Policy and Practice dimensions, respectively.

3.2.2. Benevolent leadership

The managers' benevolent leadership was assessed using five items taken from the subscale of Paternalistic Leadership Measure developed by Cheng *et al.* (2000). This scale has demonstrated consistent and good psychometric properties in several studies (e.g., Chen *et al.*, 2011). Example item is: "Beyond work relations, my supervisor expresses concern about my daily life." The reliability coefficient in this study is 0.93.

3.2.3. Core self-evaluations

The 12-items Core Self-Evaluations Scale (CSES) developed by Judge *et al.* (2003) was employed to measure cabin crew's CSE. The CSES measures a single factor that is composed of self-esteem, locus of control, generalized self-efficacy, and emotional stability. Sample items are "When I try, I generally succeed," and "Sometimes, I do not feel in control of my work. (reverse-scored)" The reliability coefficient is 0.89.

3.2.4. Upward safety communication

Five items from a scale reported by Hofmann and Morgeson (1999) were utilized to measure cabin crew's willingness of conducting upward safety communication. To precisely identify the intention of cabin crew's specific communication behavior, one item was added to the questionnaire, which asks "I'd like to propose suggestions regarding safety issues." Other example items include: "I feel comfortable discussing safety behavior with my supervisor," and "I try to avoid talking about safety issues with my supervisor. (reverse-scored)" The reliability coefficient for this scale is 0.88.

3.2.5. Safety behavior

Safety behavior consisting of two components (i.e. compliance safety behavior and proactive safety behavior) is adopted from Neal and Griffin (2006). Compliance safety behavior evaluates the core tasks that cabin crew has to accomplish to maintain flight safety. To precisely evaluate flight attendants' compliance behavior, one item was reworded to "During ground check, I will make sure all emergency equipment has been well-loaded." Proactive safety behavior applied the three items of safety participation subscale assesses the extent to which cabin crew helps develop an environment that supports safety. Some slight adjustments were made to the items to better match the work characteristics of flight attendants and the main focus of the present study. An example item is "I voluntarily carry out tasks or activities that help improve cabin safety." The reliability coefficient values for safety compliance and safety participation are 0.94 and 0.93, respectively.

3.3. Data analysis

The Cronbach's α coefficient is applied to evaluate the internal consistency of each construct. A Structural Equation Modeling (SEM) is carried out to evaluate the measurement and structural models by using the LISREL 8.52 computer program (Joreskog & Sorbom, 2001). Since all items are measured on an ordinal scale, the correlation matrix is used as input data, and the structural model is estimated with the maximum likelihood technique. According to Anderson and Gerbing's (1988) two-step approach, a measurement model is first examined using confirmatory factor analysis (CFA) to assess its adequacy, followed by testing the structural model for statistical acceptability in the second step. Various fit indices are used to assess the fitness of the model, including the following: goodness-of-fit index (GFI), adjusted goodness-of-it index (AGFI), comparative fit index (CFI) and root mean square error of approximation (RMSEA). Suggested by Hair et al. (2006), values of GFI, AGFI and CFI of 0.9 or above and RMSEA of 0.05 or less all indicate a good fit between the model and the data.

4. RESULTS

Before examining the measurement and structural models, the results of the descriptive statistics and reliability assessment are discussed as shown in Table 1. All the scales showed good reliability, with Cronbach's α values between 0.88 and 0.94, satisfying the criterion of 0.70 (Nunnally, 1978). The mean scores, obtained by averaging the associated items for each factor are calculated and used in subsequent analyses.

Table 1. Descriptive statistics and Cronbach's α (N = 296)

Constructs		Items	Mean	S.D.	Construct Mean	Cronbach's α
Safety Management System (SMS)	PO	Company develops the precise standard to monitor and evaluate the SMS performance.	5.07	1.59	4.83	0.92
		Company continuously improves the SMS performance.	4.90	1.48		
		Company's internal reporting channel is highly accessible.	4.49	1.62		
		Top management participates in the SMS related activities.	4.86	1.63		
		Management handles safety issues following just culture.	4.78	1.60		
		Top management declares a determination to execute SMS, even when the company finance is in a down cycle.	4.46	1.55		
		Top management declares commitment in formal documents.	5.22	1.43		
	PA	Employees are trained to execute the plan periodically.	5.16	1.44	5.11	0.93
		Company simulates the plan periodically.	5.70	1.40		
		Company establishes the plan with clear procedures and individual responsibility.	5.62	1.39		
		The contents of the SMS manual are readily understood.	5.27	1.50		
		Employees upgrade their self-management abilities through training	4.75	1.65		
		Employees learn comprehensive concepts of SMS through trainings.	4.75	1.67		
		Company provides continuous training.	5.41	1.41		
		Employees know how to execute SMS through training.	4.72	1.70		
		Company provides diverse training programs.	4.36	1.66		
		Company holds regular SMS promotion activities.	5.35	1.39		
Benevolent Leadership (BL)		Beyond work relations, my supervisor expresses concern about my daily life.	4.04	1.67	3.82	0.93
		My supervisor ordinarily shows a kind concern for my comfort.	4.01	1.85		
		My supervisor will help me when I'm in an emergency.	3.70	1.67		
		My supervisor takes very thoughtful care of subordinates who have spent a long time with him/her.	3.99	1.82		
		My supervisor takes good care of my family members as well.	3.37	1.68		
Core Self-evaluations (CSE)		I am confident I get the success I deserve in life.	5.15	1.05	5.05	0.89
		Sometimes I feel depressed. (R)	4.60	1.42		
		When I try, I generally succeed.	5.00	1.04		
		Sometimes when I fail I feel worthless. (R)	5.15	1.40		
		I complete tasks successfully.	5.32	0.89		
		Sometimes, I do not feel in control of my work. (R)	4.41	1.16		
		Overall, I am satisfied with myself.	5.41	1.06		
		I am filled with doubts about my competence. (R)	5.39	1.24		
		I determine what will happen in my life.	5.16	1.14		
		I do not feel in control of my success in my career. (R)	4.48	1.14		
		I am capable of coping with most of my problems.	5.28	0.93		
		There are times when things look pretty bleak and hopeless to me. (R)	5.30	1.38		
Upward Safety Communication (USC)		I'd like to propose suggestions regarding safety issues.	4.64	1.32	4.38	0.88
		I feel comfortable discussing safety behavior with my supervisor.	4.16	1.27		
		I try to avoid talking about safety issues with my supervisor. (R)	4.34	1.40		
		I feel that my supervisor openly accepts ideas for improving safety.	4.18	1.24		
		I am reluctant to discuss safety-related problems with my supervisor. (R)	4.61	1.45		
		I feel that my supervisor encourages open communication about safety.	4.34	1.19		
Compliance Safety Behavior (CSB)		During ground check, I will make sure all emergency equipment has been well-loaded.	5.76	1.18	5.68	0.94
		I follow the correct safety procedures to carry out my job.	5.67	1.22		
		I ensure the highest level of safety when I carry out my job on board.	5.61	1.24		
Proactive Safety Behavior (PSB)		I promote the safety program within the organization.	4.80	1.45	4.82	0.93
		I put in extra effort to improve the safety on board.	5.09	1.48		
		I voluntarily carry out tasks or participate in activities that help improve cabin safety.	4.57	1.59		

Note: (R) denotes reversed item and has been reverse coded.

4.1. Measurement Model

Confirmatory factor analysis was conducted to analyze the validity and reliability of the six constructs. According to Hair et al. (2006), the convergent validity of CFA results has to be supported by item reliability, construct reliability and average variance extracted. As shown in Table 2, all *t* values appear to be significant ($p < 0.01$). The construct reliability estimates (CR) range from 0.90 to 0.97, well above the critical value of 0.70 suggested by Hair et al. (1998). The average variance extracted (AVE), which measures the amount of variance that is captured by the latent variable in relation to the amount of variance due to measurement error, lies between 0.54 and 0.91, also exceeding the value of 0.50 suggested by Fornell and Larcker (1981). These results indicate that the measurement items have high reliability and validity.

Table 2. Convergent validity

Constructs	Indicators	Item reliability			CR	AVE
		Standardized Factor loadings	Standard errors	*t*-Value		
SMS Performance	PO	0.95	0.09	21.79**	0.95	0.91
	PA	0.95	0.08	22.12**		
Benevolent Leadership	BL1	0.92	0.15	20.82**	0.97	0.86
	BL2	0.94	0.11	21.68**		
	BL3	0.94	0.12	21.60**		
	BL4	0.94	0.11	21.53**		
	BL5	0.93	0.14	21.05**		
Core Self-evaluations	CSE1	0.76	0.42	15.17**	0.91	0.54
	CSE2	0.65	0.56	12.32**		
	CSE3	0.72	0.49	13.93**		
	CSE4	0.74	0.44	14.68**		
	CSE5	0.73	0.47	14.27**		
	CSE6	0.65	0.57	12.07**		
	CSE7	0.90	0.19	19.61**		
	CSE8	0.76	0.40	15.43**		
	CSE9	0.67	0.56	12.99**		
	CSE10	0.66	0.56	12.30**		
	CSE11	0.71	0.50	13.75**		
	CSE12	0.78	0.42	15.16**		
Upward Safety Communication	USC1	0.82	0.33	16.86**	0.90	0.81
	USC2	0.84	0.30	17.50**		
	USC3	0.68	0.52	13.14**		
	USC4	0.81	0.34	16.63**		
	USC5	0.78	0.39	15.57**		
	USC6	0.73	0.46	14.21**		
Compliance Safety Behavior	CSB1	0.90	0.19	19.72**	0.94	0.84
	CSB2	0.95	0.09	21.82**		
	CSB3	0.91	0.18	20.06**		
Proactive Safety Behavior	PSB1	0.91	0.16	20.40**	0.94	0.85
	PSB2	0.94	0.12	21.45**		
	PSB3	0.94	0.14	21.10**		

Note: ** denotes p <0 .01.

Discriminant validity was assessed by comparing the construct correlations with the square root of the average variance extracted (Fornell & Larcker, 1981). The results shown in Table 3 indicate that the square root of the average variance extracted for each construct is greater than the levels of the correlations involving the construct, and thus discriminant validity is confirmed.

Table 3. Discriminant validity.

Constructs	SMS	BL	CSE	USC	CSB	PSB
SMS	0.95					
BL	0.75**	0.93				
CSE	0.49**	0.56**	0.73			
USC	0.73**	0.78**	0.56**	0.90		
CSB	0.62**	0.61**	0.46**	0.60**	0.92	
PSB	0.74**	0.78**	0.52**	0.77**	0.78**	0.92

Note: * denotes $p < 0.05$, ** denotes $p < 0.01$.
SMS, Safety Management System Performance; BL, Benevolent Leadership; CSE, Core Self-evaluations; USC, Upward Safety Communication; CSB, Compliance Safety Behavior; PSB, Proactive Safety Behavior. Square root of average variance extracted (AVE) is shown on the diagonal of the matrix.

4.2. Structural Model and Hypotheses Testing

A structural equation model was applied to estimate the relationships between selected antecedents and cabin crew's safety behavior, with upward safety communication serving as a mediator. Figure 2 shows the estimated model with the standardized path coefficients. The fit indices of the structural model are summarized as follows: $\chi^2 = 396.41$($p = 0.00$), df = 150, $\chi^2/df = 2.64$, GFI = 0.89, AGFI = 0.85, RFI= 0.98, NFI = 0.98, and NNFI= 0.98. The alternative indices are CFI= 0.98, RMR =0.03, and RMSEA= 0.07. A comparison of these results with the corresponding critical values suggests that the conceptual model fits the empirical data reasonably well (Fornell & Larcker, 1981).

Regarding the hypotheses tests, eight out of the ten hypotheses are supported. The effects of upward safety communication on both types of safety behavior are significantly positive (β_1=0.26, t= 2.43; β_2=0.39, t= 4.98), indicating that the more positive attitude a cabin crew has with regard to upward safety communication, the more likely they will perform in-role and extra-role safety behaviors. H1 is thus confirmed. Regarding the direct effect of the three exogenous predictors on cabin crews' upward safety communication, all paths show a significantly direct influence, and thus H2, H5 and H8 are all supported. The statistical data also reveals the direct effect which perceived SMS performance has on a cabin crew's compliance and proactive safety behaviors (γ_2= 0.31, t = 3.42; γ_1= 0.20, t = 3.09), and H3 thus is supported. While department managers' benevolent leadership has a direct effect on cabin crews' proactive safety behavior (γ_6= 0.15, t = 2.60), it does not have the same effect on their compliance safety behavior (γ_2= 0.09, t = 0.85). Meanwhile, flight attendants' CSE has a significant positive effect on their compliance safety behavior (γ_9= 0.15, t = 2.60) and insignificant effect on their proactive safety behavior (γ_2= 0.07, t = 1.54). Therefore H6 and H9 are partially supported. Turning to the mediating effects of upward safety communication, the path coefficients reveal the complete mediating effects on the two hypothetical links between benevolent leadership and a cabin crew's compliance safety behavior, as well as cabin crew's CSE and proactive safety behavior. The partial mediating effects are revealed in other hypothesized links. Accordingly, H4, H7 and H10 are supported. The three selected predictors, which represent organizational, group and

individual aspects, are all proved to directly or indirectly influence a cabin crew's safety behaviors, via the full or partial mediating effects generated by upward safety communication.

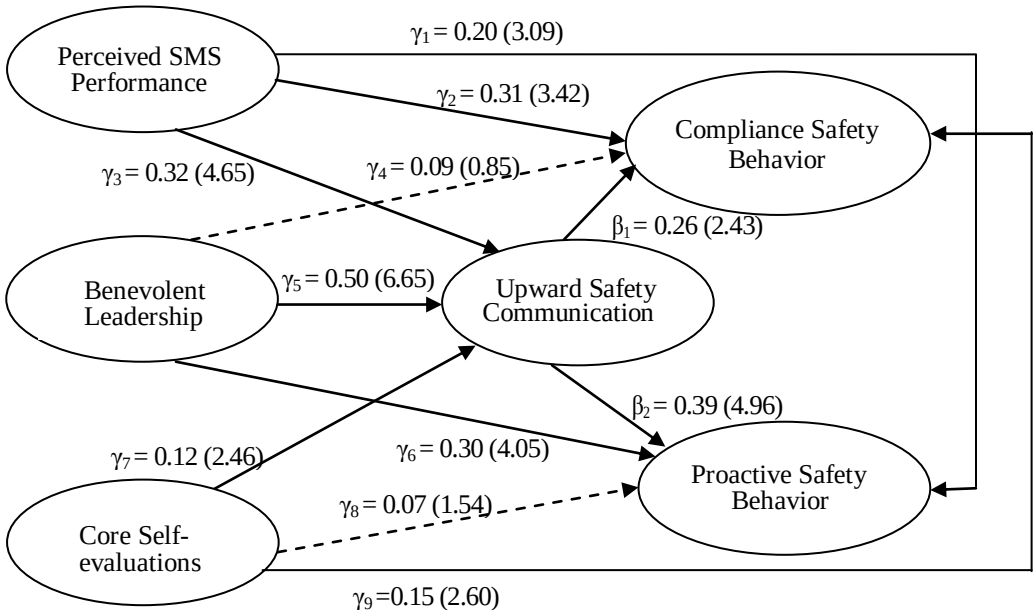

Figure 2. Estimated model.

Note.1. The values in the parentheses are t-values. 2. Solid lines denote significance at the 5% level.

Table 4 presents the effects (i.e. direct, indirect, and total) of the tri-dimensional determinants on cabin crews' compliance and participation safety behaviors. The organizational aspect (cabin crew's perceived airlines SMS performance) has the greatest effects on flight attendants safety behaviors, compared to the group and individual ones.

Table 4 Direct, indirect, and total effects of compliance and proactive safety behaviors.

Path	Direct Effect	Indirect Effect	Total effect
SMS performance → Compliance safety behavior	0.31	0.08	0.39
SMS performance → Proactive safety behavior	0.20	0.14	0.34
Benevolent leadership → Compliance safety behavior	—	0.13	0.13
Benevolent leadership → Proactive safety behavior	0.30	0.20	0.50
Core self-evaluations → Compliance safety behavior	0.15	0.03	0.18
Core self-evaluations → Proactive safety behavior	—	0.05	0.05

5. DISCUSSION AND CONCLUSION

Cabin crew's safety behavior is critical to airlines safety performance and may directly affect air travelers' safety concern. The effects of organizational, group, and individual factors on types of

cabin crews' safety behaviors have been examined and confirmed in the current study. The results show that these behaviors are simultaneously and positively associated with all three factors. Based on the empirical data, the mediating effect of upward safety communication has also been demonstrated. The first conclusion of this study is that when a cabin crew is willing to conduct upward safety communication, they are more likely to perform safety behavior well.

Regarding the organizational factor, a cabin crew's perceptions of their airline's SMS performance has significant and positive effects on their upward safety communication, compliance and proactive safety behaviors. Note that airlines' with an accredited SMS performance may be viewed as having a positive organizational safety culture (Lewis, 2008). If flight attendants recognize that the whole organization serves as one team to carry out the airline's SMS program, they are more likely to see themselves as team members, and hence devote more effort to meet their job requirements and further participate in safety promotion activities. This linkage between an airline's SMS and its employees' safety attitude supports the findings of Remawi et al. (2011). The present research also reveals that the organizational factor (e.g. perceived SMS performance) has more predictive power with regard to cabin crew's safety behaviors (a combination of compliance and proactive safety behaviors) than the selected group and individual factors, as it shows the greatest total effect. From a practical perspective, the performance of an SMS reveals the determination of an airline's managers to improve safety, and this can then convey to all employees the importance that their company places on this issue (Hsu, Li, & Chen, 2010), with safety then regarded as a collective responsibility. With the use of an SMS which aims to integrate the entire organization as one team, following principles that are laid down at the top, it is more likely then cabin crew will be motivated to conduct upward safety communication and safety behaviors, based on empirical evidence provided by the present study. Therefore, it is strongly recommended that airlines dedicate more efforts to perform and promote SMS to enhance cabin crew's safety behaviors.

As for the group-aspect indicator, to the best of the authors' knowledge, the present study is one of the first to investigate whether benevolent leadership leads to subordinates' safety behaviors. The results support the positive relations between department managers' benevolent leadership, cabin crew's upward safety communication and proactive safety behavior. However, the linkage between benevolent leadership and flight attendants' compliance safety behavior was found to be insignificant, and fully mediated by the upward safety communication. These findings do not entirely reconfirm the strong causality between leadership and employees' safety behaviors, which previous research observed (e.g. Clarke & Ward, 2006; Yang et al., 2009). More specifically, the empirical data suggests that the influence which benevolent leadership has on employees' organizational citizenship behavior is partially replicated in the case of cabin crew's safety citizenship behavior (Farh et al., 2008; Hsu, Hu, Ling, Cheng, & Chou, 2004).

The insignificant linkage between department managers' benevolent leadership and cabin crew's safety compliance (also regarded as in-role safety behavior) is unexpected but comprehensible. It is mandatory for all cabin crew trainees to pass through safety and emergency procedure training before being qualified to work as flight attendants (Rhoden et al., 2008), and it is thus expected that crew members will follow this training and comply with the various situations that may arise on-board within limited time, flight attendants tend to formulate rules of thumb for teamwork. Compared to manager's leadership, personal safety awareness and cooperation between crew members seem to have more direct influences on how flight attendants obtain their in-role safety behavior. Nevertheless, the considerable effect which managers' benevolent leadership has on cabin crew's proactive safety behavior deserves further attention.

When a cabin crew takes the initiative to participate in safety related activities, or help develop a safety-supportive environment, they not only reveal their significant recognition of the importance of safety, but also demonstrate their willingness to perform extra-role safety behavior. Since reciprocal relationships are highly valued in a Chinese cultural context, social exchange theory has been able to apply in the current paper to employ as the theoretical framework linking leadership styles to employee outcomes (Chen, Chen, & Portnoy, 2009). The study results provide valuable evidence in support of the argument that cabin crews may transform the respect, gratitude and commitment they feel toward a benevolent leader into making greater efforts to promote safety (Cheng et al., 2004). Benevolent leadership should thus be used as a management technique when supervising cabin crews.

In terms of the possible effects of cabin crew's CSE, the estimated path coefficients reveal significant impacts on a cabin crew's upward safety communication and compliance safety behavior, but an insignificant effect on proactive safety behavior. Although the relation between core self-evaluations and job performance (e.g. organizational citizenship behaviors) has been supported in previous studies (Judge et al., 1998; Piccolo et al., 2005), to date there has been a lack of empirical data to confirm the causality between individual CSE and safety behavior. We thus provide the first evidence which shows that individuals tend to perform their in-role safety behavior better when they have higher levels of self-esteem, generalized self-efficacy, locus of control and emotional stability. Since these characteristics are fundamental with regard to how one appraise oneself, others and external environment (Judge et al., 1997), people with higher CSE perceptions are likely to have more positive attitudes toward their personal obligations, and work harder to ensure the completion of their designated tasks. In the case of a cabin crew's safety responsibilities, this indicates that they will pay more attention to their in-role safety behavior, including reporting irregular situations and conducting a variety of mandatory safety checks. As for a cabin crew's proactive safety behavior, the results of this study do not support the significant effect of CSE that was hypothesized. From a comprehensive point of view, based on the conceptual model, cabin crew's extra-role safety behavior is more closely related to the group and organizational levels of their tasks than the personal one. Despite the fact that flight attendants' perceived CSE does not directly lead to proactive safety behavior, they will perform it when they have positive attitude to conduct upward safety communication, which involves interacting with others rather than merely being self-administrated.

The findings of this study contribute to enhancing the limited literature concerning flight attendants' safety behavior, and have some significant managerial implications. To motivate cabin crews to communicate upward regarding safety issues, thus ensure good SMS performance, it is important to encourage department leaders to express personal concerns and cares with regard to their staff, and to identify and hire people with high CSE. Airlines may rely on the practice of an SMS not only to support a positive safety culture (FAA, 2006), but also to increase cabin crews' willingness to perform safety behavior. In addition, cabin crews respond positively to a manager's benevolent leadership, and this indicates that benevolent leaders are needed to develop a warm family-like environment for their staff. If flight attendants view themselves as working in such an environment, they are more inclined to participate in safety promotion during off hours. Meanwhile, airlines may use items from CSE surveys during tests or face-to-face interviews when recruiting flight attendants to help identify the more appropriate candidates.

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