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Law Enforcement Officers' High-Visibility Safety Apparel: The Effect of Their Attitudes on Wearing Behavior

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ABSTRACT

The purpose of this study is to investigate how law enforcement officers' attitudes toward occupational attributes of safety, appearance, and comfort affect their wearing behavior related to High-Visibility Safety Apparel (HVSA). The results suggest that attitudes toward safety and appearance positively affect HVSA wearing behavior, while attitudes toward comfort do not. In addition, environmental factors such as providing organizational safety culture, regulation, and training are found to be necessary for changes in an individual's attitudes and behavior toward HVSA.

Keywords: High-Visibility Safety Apparel, Law Enforcement Officer, Wearing behavior

1. INTRODUCTION

High-Visibility Safety Apparel (HVSA) is classified as personal protective clothing that provides visual conspicuity for the purposes of reducing the risk of fatality or injury from traffic road crashes (ANSI/ISEA 107-2010). Traffic increases that occur every year lead to more congestion and to greater risks to law enforcement personnel. Conditions at dawn, dusk, night and during inclement weather further increase the risks (USFA, 2008). Wearing HVSA can reduce or prevent these risks (Lin & Kraus, 2009; Norris & Myers, 2013).

Traffic related fatalities are among the most common workplace hazards in the law enforcement community. They accounted for approximately 44% of all fatalities within the law enforcement community in 2002-2011, including 9% of deaths that occurred from being struck by a vehicle (NLEOMF, 2011). While law enforcement officers are on patrol in the field between calls, most officers store HVSA in the trunk of their patrol car. They also encounter diverse environments and

scenarios over the course of a work shift and fail to comply with the HVSA regulation (LaTourrette, Paterson, Bartis, Jackson, & Houser, 2003). Time and financial resources for training are limited in addressing the protection needs, which creates another barrier to the necessary use of HVSA.

Researchers have identified several indicators of negative perceptions toward HVSA among law enforcement officers. Officers generally believe that HVSA does not enhance their professional appearance and that it makes them a target in situations where they do not wish to be seen. The decreases in task efficiency, authority presence, comfort, and convenience can influence officers' perceptions toward HVSA use (Nisenson, Kubu, & Carney, 2011; Norris & Myers, 2013). In fact, the report of Nisenson et al. (2011) reveals the low frequency of wearing HVSA among law enforcement officers: 33.2% "never or rarely," 41.3% "1-3 times per month," 22.7% "1-3 times per week," and 1.6% "once per day." The importance of traffic protection behavior is largely ignored due to the negative perceptions toward the use of HVSA in the law enforcement workplace (LaTourrette et al., 2003; Nisenson et al., 2011). The environmental factors such as exemption from Federal regulation, insufficient HVSA safety training, and lack of safety enforcement may affect organizational practice and an individual's perception toward the use of HVSA. Despite the well-known protective value of HVSA, no research has considered law enforcement officers' attitudes toward HVSA and their HVSA wearing behavior. This study will address this gap in research.

Research on personal protective clothing has mostly focused on mobility or physical comfort (e.g., Barker, Black, & Cloud, 2010; Dorman & Havenith, 2009). Relatively few studies have examined wearers' attitudes and behavior toward protective clothing (e.g., Norris & Myers, 2013; Quistberg, Bennett, Quan, & Ebel, 2014). The Institute for Police Research (Nisenson et al., 2011) is the only one that studied HVSA in the law enforcement community. To provide insight into this unexplored area, the current study examines how law enforcement officers' attitudes toward safety, appearance, and comfort affect their HVSA wearing behavior. In addition, the study evaluates the current environmental factors such as organizational safety culture, regulation, and training with regard to wearing HVSA.

2. LITERATURE REVIEW

2.1. High-Visibility Safety Apparel (HVSA)

HVSA provides conspicuity during both daytime and nighttime, which meets the American National Standards ANSI/ISEA 107-2010. *Conspicuity* is defined as "the characteristics of an object influencing the probability that it comes to the attention of an observer, especially in a complex environment" (ANSI/ISEA 107-2010, p.2). The lack of visual conspicuity is one of primary causes of traffic road crashes. Although personal protective clothing is designed to enhance workers' comfort or safety, some workers may perceive discomfort due to decreased mobility and heat stress, thus reducing task efficiency (Chen, Chen, & Wang, 2013; Dorman & Havenith, 2009). This negative perception may lead officers to reject wearing protective clothes; they may even store them in the trunk of a patrol car, an ill-chosen place due to heat, accessibility, soiling, and dirt.

2.1.1. HVSA types and features

The visible material of HVSA consists of three parts (see Appendix 1): background material, retro-reflective material, and combined-performance material. The background material has colored fluorescent material that emits optical radiation at wavelengths longer than those of the light that is absorbed. The retro-reflective material (i.e., reflective band on apparel) reflects light directly back to its light source and produces relatively higher conspicuity. The combined-performance material is a retro-reflective material that is

also a fluorescent material (ANSI/ISEA 107-2010; CSA, 2009). HVSAs made for law enforcement officers often provide functional features such as shorter torso coverage for access to belt-mounted equipment and tearing-away shoulders (see Appendix 1). These functional features provide flexibility to accommodate a tactical need for law enforcement personnel, emergency responders and firefighters (ANSI/ISEA 207-2011). As such, efforts have been made to accommodate physical comfort and tactical efficiency in performance to meet law enforcement officers' occupational needs. Nevertheless, a large number of law enforcement officers rarely wear HVSA during their patrol duties, and their attitudes toward HVSA appear to affect their use of this apparel (LaTourrette et al., 2003; Nisenson et al., 2011).

2.1.2. HVSA regulation

When uniformed law enforcement officers direct traffic, investigate crashes, and handle lane closures, obstructed roadways and disasters, they are required to wear HVSAs as described in the Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD). However, when law enforcement officers undertake other patrol duties that are different from those listed, they are exempt from the HVSA requirement (Federal Register, 2009). Consequently, the exception from the Federal regulation is subject to individual interpretations. Furthermore, the enforcement of regulation appears to be weak, and insufficient training relates to a low level of knowledge on HVSA (Nisenson et al., 2011). As such, law enforcement officers' unsafe actions seem to arise from ineffective regulation, weak enforcement of rules, lack of training, and unsafe organizational culture toward a certain protection (Nielsen, 2014; Nisenson et al., 2011).

2.2. The Safety Triad

The Safety Triad, the triangle of safety-related factors proposed by Geller (2000), is the conceptual framework of this study that explains the importance of person, environment, and behavior factors for improving organizational safety. These three factors are interactive and ultimately influence each other, resulting in an organization's performance of safety. Increased HVSA usage can influence such personal factors as an individual's safety related attitudes, intentions, and beliefs and behaviors, eventually reducing the probability of traffic accidents in a law enforcement organization (Geller, 2000, Norris & Myers, 2013)

This conceptual framework outlined in Figure 1 presents the linkage of these safety-related factors: *personal factors* include people's attitudes, beliefs, knowledge, and personalities that influence their willingness to guard their own safety and others' safety; *environmental factors* include equipment, tool, physical layout, procedures, standards, and organizational culture factors such as management support that influence safety; and *behavioral factors* include safe and at-risk practices as well as going beyond the call of duty to intervene on behalf of another person's safety (Geller, 2000).

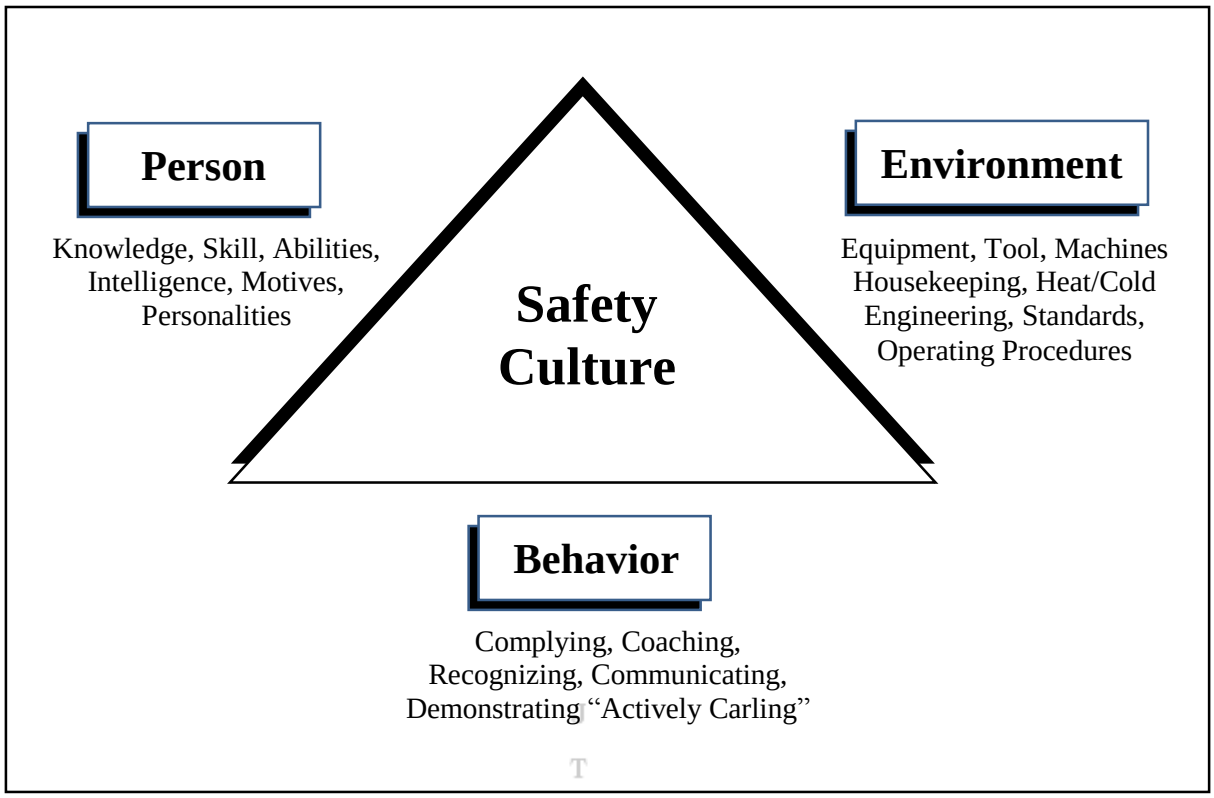

Figure 1. The Safety Triad. The schematic presentation of conceptual framework. Adapted from Geller, E. S. (2000), p.25, *Psychology of safety handbook (2nd edition)*, Boca Raton, FL, USA: CRC Press,

The personal and behavioral factors represent the human elements of occupational safety that can relate to an individual's behavior with regard to wearing HVSA. Consistent with human nature, it is often more comfortable, convenient, and efficient not to wear personal protective clothing than to comply with the safety procedure. Thus, an effective strategy to increase HVSA usage must include the intervention of personal factors such as attitudes and perceptions and environmental factors such as organizational culture and regulation for long-term behavior changes (Geller, 2000; Ali, Saeed, Ali, & Haidar, 2011).

2.3. Theory of Reasoned Action (TRA)

An individual will perform a certain behavior willingly if he or she has a positive attitude toward the behavior. Attitude refers to an expression of a person's favorable or unfavorable evaluation of an object. Defined as "observable acts of the subject" (Fishbein & Ajzen, 1975, p.13), behavior is the response of the subject to various stimuli in its environment. When individuals have positive or negative attitudes toward a behavior, they intend to behave consistently with their attitudes (Ajzen, 1985). Conversely, when people behave inconsistently with their perceptions or attitudes, they feel discomfort, and they are naturally inclined to adjust their attitudes to parallel their actions (Festinger, 1957). The current study focuses on attitude determinants of specific behavior (i.e., HVSA use) guided by a reasoned action approach, assuming that individuals' behaviors follow their attitudes (Fishbein & Ajzen, 2005).

In relation to the Theory of Reasoned Action, law enforcement officers may intend to wear HVSA when they evaluate it positively. Thus, without the intervention of the determinants of intentions, persuading law enforcement officers to wear HVSA more frequently and to comply with safety regulation may not change their behaviors in the long term. Therefore, this study begins with the assumption that intervening in one's attitudes toward HVSA can influence behavior related to wearing HVSA, directly or indirectly. This assumption is explored by applying the Theory of Reasoned Action to safety behavior.

2.4. Law Enforcement Officers' Attitudes

2.4.1. Safety attitudes

Occupational safety attitudes have been found to correlate positively with personal protective equipment (PPE) use (Braham, Finch, McIntosh, & McCrory, 2004; Carpenter, Lee, Gunderson, & Stueland, 2002; Donald & Canter, 1993, 1994). Donald and Canter (1993, 1994) emphasize the importance of human factors in safety behavior and conclude that one can predict the likely accident rate within an organization by examining the safety attitudes of its employees. Despite well-documented safety risks, the routine use of HVSA is not perceived as important as it should be among law enforcement officers. Furthermore, researchers have not investigated whether safety attitudes predict HVSA wearing behavior among law enforcement officers.

The recognition of potential hazards is influential in establishing and changing attitudes toward hazards. For example, the extent to which law enforcement officers perceive the traffic accident risk may be a factor in forming their attitudes toward HVSA wearing behavior (Quistberg et al., 2014; Yates & Chua, 2002). According to the 2010 data from the U.S. Bureau of Labor Statistics, a total of 134 deaths were recorded among law enforcement officers in the United States; 42.5% of these deaths were caused by traffic-related incidents (B.L.S., 2010). Other than deaths, there have been no comprehensive injury data classified by specific causes of traffic accidents. Due to the incomprehensiveness of the data, the number of law enforcement officers who were injured, rather than killed, by being struck by vehicles may have not been included in the traffic fatality risk assessment. This incomplete risk assessment may lead the law enforcement organization to perceive that the level of risk is lower than the actual risks of traffic safety hazards.

When law enforcement officers' routine tasks include patrol duties near moving vehicles, they become familiar with traffic hazards and may even forget about the existence of risks to safety. Moreover, when everyone is assigned to patrol duties multiple times throughout their career, they are more likely to perceive a lower level of risk (Donald & Canter, 1994; Sandman, 1991). Accordingly, law enforcement officers may not perceive the traffic fatality risk on the job as high as it should be.

Individuals with positive safety attitudes tend to have a high level of safety performance and a low accident rate (Donald & Canter, 1994). Braham et al. (2004) identify a positive relationship between safety attitudes and usage of protective equipment among football players. Therefore, we expect that positive attitudes toward wearing HVSA will lead law enforcement officers to wear HVSA more frequently.

2.4.2. Appearance attitudes

A law enforcement uniform serves its occupational functions. It must be durable, identify the wearer as a law enforcement officer, and provide some protection from other external

environmental conditions. Simultaneously, it must provide comfort without hindering mobility. A uniform conveys the power and authority of the wearer and serves as an essential tool for patrol officers' own protection (Dunn, 2009; Paul & Birzer, 2013).

Bem's self-perception theory (1972) asserts that "individuals come to 'know' their own attitudes, emotions, and other internal states partially by inferring them from observations of their own overt behavior and/or the circumstances in which this behavior occurs" (p. 2). In other words, self-perception arises from an individual's own actions and responses. Kellerman and Laird (1982) also advocate this self-perception theory by suggesting that appearances affecting viewers' formations of impression may also affect impressions of self (i.e., self-perception). Based on self-perception theory (Bem, 1972), this study examines whether law enforcement officers' wearing behavior of HVSA is affected by their own positive judgment of their appearance in HVSA.

Clothing is an important vehicle that an individual uses to provide himself or herself with symbolic meaning and to create non-verbal communication between wearers and viewers (Johnson, 2005, 2013; Kwon, 1994; Thurston, Lennon, & Clayton, 1990). The color of clothing plays an important role in the formation of the symbolic meaning and has a considerable impact on self-perceptions of the wearer (Gundersen, 1978; Johnson, 2005, 2013). Being accustomed to the dark colors of traditional uniforms, some law enforcement officers may perceive that the bright colors of HVSA have a damaging effect on their professional appearance. Conversely, when law enforcement officers have a positive self-perception on their appearance when wearing HVSA, they may perceive that HVSA enhances their professional presence. This positive self-perception may influence them to wear HVSA more frequently or for a longer duration.

Past research supports that clothing affects occupational self-perception with respect to such traits as responsibility, competence, trustworthiness, professionalism, and efficiency (e.g., Kwon, 1994; Thurston et al., 1990). Based on these notions, the current study evaluates how such attitudes of self-perception relate to consistent HVSA use. Individuals' positive perception of their own appearance can result in favorable wearing experiences, influencing their intention to wear HVSA and to use this apparel with more frequency.

2.4.3. Comfort attitudes

Feeling comfort involves various physical and non-physical stimuli. Several research models of clothing comfort indicate that the comfort dimensions are composed of physical, social-psychological, and environmental attributes (Branson & Sweeney, 1991; Fourt & Hollies, 1970; Pontrelli, 1977; Sontag, 1985). For personal protective clothing, comfort is one of the key factors associated with possible causes of safety behavior change (Geller, 2000; Quistberg et al., 2014).

In the previous literature on comfort, the environmental factor appears to play a critical role in establishing a comfort level (e.g., Branson & Sweeney, 1991; Slater, 1986). Slater (1986) defines comfort as "a pleasant state of physiological, psychological, and physical harmony between a human being and the environment" (p.158). The physical comfort of clothing relates directly to either physiological or psychological comfort and involves textile properties and environment (Slater, 1986). His study also emphasizes the importance of the perception of comfort when it involves safety. For example, in an environment defined by extreme weather, a sensation of discomfort from severe cold can force wearers not to use thermal protection equipment or clothing in order to walk more quickly. When exposure to risky

low temperatures increases to several hours, the situation can become critical, even life-threatening (Slater, 1986). This study suggests that discomfort can be harmful while comfort can be beneficial to one's safety in this circumstance.

Comfort and ease of use, time required to wear, and convenience are found to be major factors that determine whether or not to use personal protective clothing (e.g., Carpenter et al., 2002; Quistberg et al., 2014). In fact, Carpenter et al. (2002) suggest that comfort, ease, and convenience (i.e., time required and cost) of use have some influence on decisions to wear protective clothing. Similarly, a qualitative study by Quistberg et al. (2014) explores behavioral factors and intervention strategies to encourage the consistent use of a life jacket among adult recreational boaters, and identifies discomfort as a barrier to the routine use of protective clothing. Therefore, we can posit that the presence of comfort may affect law enforcement officers' decision to use HVSA.

3. HYPOTHESES DEVELOPMENT

This study investigates how law enforcement officers' attitudes toward occupational attributes of safety, appearance, and comfort affect their wearing behavior of HVSA. The literature consistently suggests that a positive relationship exists between safety attitudes and usage of protective equipment (Braham et al., 2004). Past research supports that positive self-perception of one's appearance may deliver pleasant wearing experiences, thus influences one's intention to wear a certain type of apparel (Bem, 1972; Kwon, 1994). Lastly, comfort attitudes have been found to be one of the most important factors determining the routine use of protective clothing (Quistberg et al., 2014). Based on the prior research and the nature of the law enforcement occupation, we expect that the presence of safety, appearance, and comfort may positively affect law enforcement officers' decision to use HVSA and will predict the duration of HVSA use. The hypotheses proposed in the study are as follows:

H1: Law enforcement officers' positive attitudes toward safety in wearing HVSA will predict a longer duration of HVSA use.

H2: Law enforcement officers' positive attitudes toward their professional appearance in HVSA will predict a longer duration of HVSA use.

H3: Law enforcement officers' positive attitudes toward comfort in wearing HVSA will predict a longer duration of HVSA use.

4. METHODS

4.1. Survey Contents

We obtained a data set by conducting a survey with law enforcement officers in four cities of Yavapai County (i.e., Prescott, Prescott-Valley, Chino-Valley, Cottonwood) in Arizona, where environmental conditions are exceedingly hot and dry. The research instrument was anonymous and utilized a voluntary survey method. The surveys were answered through paper and pencil and each survey was pre-assigned a code number for verifying its return. First, a survey proposal, a cover letter, and questionnaire were submitted for approval to six City Police Departments across the Northern Arizona region. Four City Police Departments out of six agreed to participate in this study. A total of 196 surveys were distributed on site to these four City Police Departments over a three-month period between September 2012 and December 2012.

The participants were required to use HVSA when directing traffic, investigating crashes, and handling lane closures, obstructed roadways, and

disasters according to Federal regulation 23 CFR Part 634.2 (Federal Register, 2006, 2008). The law enforcement uniforms are of a standard type for Yavapai County police. They consist of dark navy, matching shirt and trousers, and a black leather duty belt which carries handcuffs, portable lighting (i.e., flashlights), baton, radios, magazine pouch, and hand-held protection devices such as a firearm. Sometimes officers use suspenders or harnesses which transfer some of the duty belt weight (average weight nearing 19-21 pounds) to the shoulders, lowering the amount of the load concentrated at the waist and the back. Body armor (i.e., bulletproof vest) is often issued to law enforcement officers, typically in the form of a lightweight vest that can be worn under the shirts. HVSA is worn on top of these standard uniforms.

The instrument was designed to measure attitudes toward officers' safety, appearance, comfort while wearing HVSA (i.e., independent variables), and the duration that they wore this apparel measured in minutes (i.e., dependent variable). Each of the attitude measurement items was measured on Visual Analogue Scale (VAS) that has a ten-centimeter line anchored at each end by descriptive words of "strongly disagree" and "strongly agree." The outcome variable of the amount of HVSA use was measured according to the extent of the duration of the use (i.e., actual wearing duration measured in minutes), with a higher score indicating a higher level of HVSA usage. In general, Visual Analog Scales have been identified as providing more accurate information and showing a more normal distribution compared to Likert-type categorical scales, although a greater amount of time and effort are necessary for reading the data in a paper-based survey (Couper, Tourangeau, Conrad, & Singer, 2006; Reips & Funke, 2008).

4.2. Measurement

Safety attitudes scale items were derived from the safety attitude scale of Donald and Canter (1994) and were modified for the personal protective clothing context. *Appearance* items were adapted from the self-perception of occupational attributes in Kwon's (1994) study. *Comfort* and *convenience* items were developed by the researchers based on previous researchers' descriptions of uniform comfort and convenience related to the law enforcement occupation (Barker, 2007; Horridge, Caddel, & Simonton, 2002). Lastly, the item of HVSA wearing behavior was developed by the researchers to indicate the duration of HVSA use (i.e., measured in minutes per month). Scale items were summarized in Table 2.

Content analysis of the validity of the survey items was conducted by a group of six academic experts in the fields of safety, psychology, and social sciences. These experts assessed whether the items were reflective of attitude and behavior to be measured (Anastasi & Urbina, 1997). The clarity and readability of survey items were reviewed by these experts and the items were revised according to their comments. The reviewers agreed that the revised survey items actually measure the constructs of attitudes (i.e., safety, appearance, and comfort) and behavior (i.e., duration of HVSA use).

5. ANALYSES AND RESULTS

5.1. Respondents' profile

A total of 74 usable responses were collected out of 196 surveys that were distributed, yielding a 37.8% response rate. The analysis of respondents' demographic information (Table 1) reveals that their ages ranged from 24 to 61 with the median age of 37 years (N = 74, SD = 8.71) and that the job experience ranged from 5 months to 38 years with the median of 9 years (SD = 7.25). The majority of the participants fell

into the Caucasian ethnic group (n = 67, 90.5%) followed by the Hispanic ethnic group (n = 5, 6.8%). The female participants composed a very small portion (n = 5, 6.8%).

5.2. Results

The reliability of survey items was evaluated by Cronbach's alpha coefficient (1951). The Cronbach's alpha coefficients of final data sets were .67 for safety attitudes, .77 for appearance, and .73 for comfort, as summarized in Table 2. They all exceeded 0.6, indicating acceptable reliability measures for a small sample size (Hair, Black, Babin, Anderson, & Tatham, 2006).

Table 1.
Respondents' profile (N=74)

Demographic Variable	%		%
Gender		Rank	
Male	93.2	Officer, deputy, trooper	58.1
Female	6.8	Corporal	6.8
		Sergeant	23.0
Age		Captain or above	2.7
21 – 30	18.4	Other	8.1
31 – 40	45.9		
41 – 50	27.6	Education	
51 or older	8.2	High school or less	5.4
		Associate degree	62.2
Police Job Experience		Bachelor's degree	24.3
Less than 2 years	8.2	Graduate degree	4.1
2 – 5 years	15.3		
6 – 10 years	33.7	Marital Status	
11 – 20 years	32.7	Married	83.8
21 years or longer	10.2	Single, never married	12.2
		Separated, divorced, widowed	4.1
Race			
White/Caucasian	90.5	Area Classification	
African-American	2.7	Urban area	72.4
Hispanic	6.8	Suburban area	4.1
		Rural area	22.4

Table 2.
Survey scale items (*N*=74)

Scale Items	Mean	SD	Reliability
Safety attitudes (IV)	**6.66**	**1.75**	**.67**
- HVSA prevents getting struck by vehicle.	7.30	2.00	
- I feel safer when wearing a HVSA.	5.46	2.58	
- HVSA help officers to avoid traffic-related injuries/fatalities.	7.21	2.13	
Appearance attitudes (IV)	**7.58**	**2.07**	**.77**
- I feel inclined not to wear a HVSA since it makes me look like a highway worker. (r)	7.92	2.12	
- I feel that wearing HVSA has a negative impact on my – command presence. (r)	7.23	2.45	
Comfort attitudes (IV)	**6.99**	**1.89**	**.73**
- Overall comfort of high-visibility safety vests is satisfactory.	6.71	1.90	
- My HVSA is comfortable.	7.09	2.62	
- Wearing a HVSA is too much of a hassle. (r)	7.17	2.46	
Duration of HVSA use (DV)			-
- How many minutes of each month do you actually wear HVSA? (minutes per month)	**131.76 (min)**	**105.66**	

Notes. 1) Independent variables (IV): Safety, appearance, and comfort attitudes items measured on Visual Analogue Scale (VAS), a ten-centimeter line anchored at each end by descriptive words of strongly disagree and strongly agree (0 – 10cm). 2) Dependent variable (DV): Duration of HVSA use measured in minutes per month.

5.2.1. Hierarchical regression analysis

A three-stage hierarchical regression was conducted to evaluate the relationship between a set of independent variables of attitudes (i.e., safety, appearance, and comfort) and the dependent variable of duration of HVSA use (Pedhazur, 1997). The safety attitudes were entered at stage one (i.e., model 1), the appearance attitudes at stage two (i.e., model 2), and the comfort attitudes at stage three (i.e., model 3). At stage one (i.e., safety attitudes entered in model 1), HVSA use and the change in R^2 (F change) was significant ($F(1,72) = 9.63$, $p < .01$). Adding appearance attitudes to the regression model (i.e., model 2) explained an additional 4.56% of the variation in duration of HVSA use and this change in R^2 was significant, $F(1,72) = 4.56$, $p < .05$. In addition, the Cohen's (1988) effect size of R^2 for hierarchical multiple regression indicated a medium effect size ($R^2 = .17$). However, after adding comfort attitudes to the regression model at stage three (i.e., model 3), the change in R^2 was found to be insignificant ($F(1,72) = .93$, $p > .05$). As a result, comfort attitudes were excluded in final regression equation for predicting the duration of HVSA. As a final model in this study, model 2 included two independent variables of safety and appearance attitudes.

Based on model 2, which included safety and appearance attitudes (Table 3), a significant regression equation was found ($F(1,72) = 7.33$, $p < .01$) and these two independent variables accounted for approximately 17% of the variance in duration of HVSA. Participants' predicted

duration of HVSA use is equal to – 85.15 + 19.04 (safety attitudes) + 11.90 (appearance attitudes) minutes per month. The regression equation is as follows (– 85.15 is y-intercept):

Duration of HVSA use = – 85.15 + 19.04 (safety attitudes) + 11.9 (appearance attitudes)

As illustrated in Table 3, the results of hierarchical regression indicated that law enforcement officers' safety and appearance attitudes predict the duration of HVSA use. Thus, hypotheses 1 and 2 were supported. That is, law enforcement officers with more positive attitudes toward safety and appearance would display a greater usage of HVSA during their patrol duties. However, contrary to the proposed hypothesis 3, the attitude toward comfort did not predict participants' duration of HVSA use.

Table 3.
Result of hierarchical regression analysis (N = 74)

	Model 1			**Model 2**			**Model 3**		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*B*
Safety	20.8	6.70	.34**	19.04	6.60	.31**	19.45	6.61	.32**
Appearance				11.90	5.57	.23*	14.88	6.37	.29*
Comfort							-6.73	6.97	-.12
R^2		.12			.17			.18	
F for change in R^2		9.63**			4.56*			.93	

Note. *p < .05. **p < .01.
B = unstandardized coefficients. β = standardized coefficients.

5.2.2. Descriptive analysis of environmental factors

The prevailing environmental factors, such as regulation and organizational safety culture that could affect law enforcement personnel's HVSA wearing behavior, were not part of the main analyses. These factors were provided to enhance the understanding of the current practices of HVSAs. *The Safety Triad* (Geller, 2000), the conceptual framework of this study, supports the importance of environmental factors that interact and thus affect personal and behavioral factors. In other words, law enforcement officers' behavior is affected not only by attitudes toward HVSA, but also by other environmental factors such as procedures, standards, and organizational culture (Geller, 2000). The descriptive analysis of these environmental factors was as follows: the majority of participants (n = 74, 99%) recognized that using HVSA during their traffic-related patrol duties was required; law enforcement officers were aware of regulations (31.5%); the most important factor that motivated officers to wear HVSA was higher authorities (28.3%), followed by practice in the law enforcement community (17.4%); and when law enforcement officers failed to comply with an existing HVSA wearing policy, they received either minor reprimands (71.6%) such as a verbal or written reprimands, or no reprimand (20.9%).

Mean scores were compared to determine the difference between the duration of actual HVSA use and the duration of use required by regulation. The overall mean of duration of actual HVSA use (M = 131.76, SD = 105.66) was higher than the mean of required duration (M = 110, SD = 105.67). It indicated that law enforcement officers would wear HVSA more frequently than is required by regulation. The lack of regulation enforcement was clearly revealed.

Safety training helps to reduce incidents, to stay in compliance and to change safety culture. Training may be necessary due to employees' lack of knowledge about work processes, safety, or any aspects of behavior that needs to be changed (Geller, 2000). In terms of HVSA safety training, the majority of participants did not have HVSA safety training (n = 73, 74.5%) and the areas of training that needed the most (i.e., the least trained area, 4.3%) were found to be care, maintenance, and replacement of HVSA.

6. DISCUSSION AND IMPLICATIONS

Based on this generalized theory of reasoned action (Ajzen, 1985; Fishbein & Ajzen, 1975), this study examines the relationship between attitudes toward occupational attributes and wearing behaviors of personal protective clothing. This study applies Geller's *The Safety Triad* (Geller, 2000), the triangle of safety-related factors. The results show that attitudes toward safety and appearance attributes are positively associated with the individuals' HVSA wearing behavior, while the attitude toward comfort did not explain HVSA wearing behavior. These results indicate that attitudes toward safety and appearance are critical factors in predicting law enforcement officers' tendencies to conform or violate the regulation of HVSA use. However, law enforcement officers may not view the comfort of HVSA as important as they view safety and functionality.

Our findings on HVSA wearing behavior and attitudes provide information that is insightful to law enforcement organizations and policy makers. First, based on the finding that safety attitudes influence law enforcement officers' HVSA wearing behavior, the organization can nurture a culture of safety in which safety and health are understood and accepted as high priorities. While an educational component of this culture would convey theories or principles, training programs get into the specifics of how to turn principles into effective safety actions. Attitudes and perceptions can be influenced directly by education programs, whereas behaviors are directly influenced by training programs (Geller, 2000; Norris & Myers, 2013). If law enforcement officers are not educated about the principles behind a safety policy, their participation may be only minimal. Therefore, a strategic combination of both education and training will be most effective in modifying both attitudes toward safety and behavior related to wearing HVSA.

Second, law enforcement organizations may consider developing a new HVSA design that better conveys the authority and power of law enforcement officers. A new design will help organizations to reduce officers' resistance to wearing HVSAs, and shift their negative attitudes toward a positive direction. This new design can have a psychological impact on the self-perceptions of the wearers and can positively affect their behaviors related to wearing HVSA (Bem, 1972; Gundersen, 1978; Johnson, 2005).

Third, although comfort is not found to be related to HVSA wearing behavior, current HVSA usage within law enforcement organizations indicate that there are problems associated with fitting and garment size. Garment fitting and appropriate size for each individual should be checked when distributing new HVSAs to law enforcement personnel because an individual's body size

and physical shape tend to change over the course of his or her life in relation to age, gender, and dietary and exercise practices. Providing more sizing choices to accommodate smaller (x-small and small) and larger sizes (x-large) can also help to improve behavior related to wearing HVSA (Quistberg et al., 2014).

An organization providing workplace safety culture, regulation, and training has been found to produce an individual's positive attitudes about safety (Geller, 2000; Nielsen, 2014). The penalty of failure to comply with policy was simply a minor warning or no consequence at all. These small penalties imply that there is a general lack of regulation enforcement in HVSA use. The final outcome of HVSA use can be attributed to law enforcement agencies' varying discretions when issuing HVSA. The outcome can also be attributed to existing policies and their reinforcement, to officers' preferences, to the implementation or lack of HVSA training and education, and to instances when law enforcement officers are granted exemptions from Federal regulations. These regulations, organizational safety culture, and practices remain critical for long-term changes in an individual's attitudes toward and behavior regarding HVSA use.

One major limitation to the current study is the possible insufficient measure of target behaviors (i.e. use or non-use of HVSA) because participants' wearing action occurs randomly and individually outside of police offices and is thus difficult to monitor. Other measures need to be explored to obtain accurate responses on HVSA wearing behavior. Furthermore, the data collected is limited to four cities in Yavapai County in Arizona. Results can only be generalized to the law enforcement officers who were involved in the study and not to all law enforcement officers in other locations. Broader and larger samples from various environmental settings are necessary to enhance the generalizability of the findings. Finally, future studies can explore different dimensions of personal factors such as personalities, motivation, knowledge, and psycho-social factors and how they influence HVSA wearing behavior.

7. CONCLUSION

This study contributes to the research on HVSA by providing information about the factors that influence law enforcement officers' decisions to wear HVSA. It informs safety training officers and law enforcement organizations of the need to develop successful training and practice programs. In educating and training, safety and appearance must be emphasized to increase voluntary compliance.

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Appendix 1 Examples of Performance Class and Types in HVSA. Source from High Visibility Apparel in Work Zones, Characteristics of High-Visibility Safety Apparel, Pocket guide, The American Traffic Safety Services (ATSSA, 2009).

Example of each Type of Material

Background material

Retroreflective material

Combined-performance material

a

b

c

d

Example of Performance Class & Types

a. Michigan DOT- Performance Class 2 apparel (with split trim). (DOT: Department of Transportation)

b. Washington DOT- Performance Class 2 apparel.

c. Performance Class 3(short sleeve).

d. Public Safety Vest.