The first empirical test of Human Factors integration in frontline policing

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SUMMARY

This study presents the first empirical test of aviation-derived Human Factors (HF) training within frontline policing. Longitudinal surveys of serving police officers and interviews with aviation specialists examined the relevance, transferability and operational impact of HF principles in this context. Findings were consistent with literature indicating that HF has not yet been adopted within policing, and participants reported low baseline familiarity with related concepts. Post-training responses demonstrated substantial gains in understanding, confidence and behavioural application. Most officers (89%) reported using HF operationally, with strong perceived benefits for safety and performance. The results indicate clear potential for HF to strengthen decision-making, safety and organisational learning across policing and the wider emergency services.

KEYWORDS

Human Factors, Crew Resource Management (CRM), Training, Policing, Emergency Services.

Introduction

Frontline policing is characterised by rapid decision-making, dynamic environments, incomplete information, and performance under intense scrutiny. Comparable challenges in international aviation (Pecena, 2017) have been addressed through the systematic adoption of Human Factors (HF), Crew Resource Management (CRM) and Just Culture frameworks, contributing to substantial safety improvements over recent decades (Mulenberg, 2001; Hagen, 2013; IATA, 2024). Despite these parallels, HF has not yet been adopted within frontline policing in any jurisdiction.

This study responds directly to that gap by conducting the first empirical test of Human Factors integration within frontline policing. A Royal Air Force (RAF) Human Factors Foundation Course was delivered to a cohort of frontline officers within a UK police force (Military Aviation Authority, 2023; Ministry of Defence, 2025a). Using a longitudinal mixed-methods design, the research evaluates baseline familiarity, immediate post-course impact, and two-month behavioural transfer, alongside perspectives from external aviation specialists. By testing HF integration in routine frontline policing practice, this study provides original empirical insight into the feasibility, relevance, and early cultural diffusion of HF within frontline policing, with potential implications for wider emergency services.

Background

Modern aviation has achieved significant safety improvements through the systematic integration of Human Factors (HF) across training, operational practice and accident investigation (Hagen, 2013; Civil Aviation Authority, 2023; IATA, 2024). HF approaches recognise that performance and error are shaped by interacting human, organisational and environmental conditions rather than solely individual actions, supporting safety philosophies such as Just Culture which prioritise systemic

learning over individual blame (Reason, 1990; Dekker, 2002, 2016). Within this context, structured behavioural assessment models such as the Baines Simmons (2022) FAIR3 framework are used to support balanced evaluation of intent, context and contributory factors in an incident.

Police officers routinely make time-critical decisions with incomplete information and under intense scrutiny (Galanis, Fragkou and Katsoulas, 2021; Gau, Paoline and Paul, 2022; Pyle, 2022). This is often in complex, rapidly evolving, traumatic or dangerous environments (Police Federation, 2022; Jaeger, 2023). These conditions reflect many of the human performance challenges addressed by Human Factors frameworks.

In the UK, national guidance for policing practice is provided through the College of Policing's Authorised Professional Practice (APP) framework. Human Factors is not formally applied within policing, and the term does not appear in any APP (College of Policing, 2025). Despite extensive searching, there appears to be no empirical research examining the application of Human Factors or Crew Resource Management to the general duties of frontline policing in any jurisdiction.

When adverse incidents occur, investigations are typically conducted internally by Professional Standards Departments or by the Independent Office for Police Conduct (HMICFRS, 2019; IOPC, 2023). These formal processes are usually triggered by public complaints, serious incidents, or suspected breaches of the standards of professional behaviour. These breaches may arise from accidental or unintentional actions as well as deliberate misconduct. Investigations primarily focus on determining whether an officer's actions breached professional standards. While organisational learning does emerge from investigations or internal debrief processes, the primary emphasis remains accountability and individual conduct.

Reporting systems also influence how organisations learn from error. In UK aviation, systems such as the Confidential Human Factors Incident Reporting Programme (CHIRP) enable personnel to report safety or performance concerns, incidents and organisational issues in a protected and non-punitive manner (CHIRP, 2025; Civil Aviation Authority, 2025). In contrast, confidential reporting channels within UK policing are primarily designed to report corruption or misconduct (Norfolk Police, 2025). Where reporting systems focus mainly on identifying wrongdoing, this may discourage open reporting of mistakes or emerging risks and limit opportunities to identify deeper systemic issues (Reason, 2016; Metcalfe, 2017; Tomkins, 2020).

Despite the maturity of Human Factors across many high-risk sectors, its empirical integration within general frontline policing has not been tested. Existing literature has argued conceptually for the relevance of CRM to policing (Pecena, 2017), applied HF frameworks retrospectively to specific incidents (Martin, 2016; McFarlane and Amin, 2021), and explored related decision-making contexts such as police shootings through simulation (Taylor, 2019). Grey literature from the Federal Bureau of Investigation (FBI) has also discussed the relevance of HF principles within policing leadership and stress management contexts (Bone, Normore and Javidi, 2015). While these studies support the plausibility of transfer, they do not empirically examine whether frontline officers can apply HF principles within everyday operational practice.

Method

A qualitative-dominant mixed-methods design was used to evaluate the relevance, transferability and early operational impact of Human Factors (HF) within frontline policing. Longitudinal survey data from participating police officers was combined with semi-structured interviews from aviation HF specialists. Twenty-three frontline officers from a UK police force participated in the study. Participants were all active operational officers and represented a range of ranks, ages, genders, roles, base locations, and lengths of service. Participation was voluntary and anonymised, with informed consent obtained in writing.

Participants attended a standard Royal Air Force Human Factors Foundation Course which is routinely delivered to aircrew and safety-critical personnel (Military Aviation Authority, 2023; Ministry of Defence, 2025a, 2025b). The course was delivered by an RAF Human Factors Facilitator with extensive training and operational experience. The core curriculum was retained, although examples were contextualised for policing where appropriate. The course covered key HF principles including decision-making, situational awareness, stress, communication, group dynamics, fatigue, and Just Culture. Structured error analysis models including SHEL(L) and HFACS were introduced to support understanding of system influences on performance (Edwards, 1972; Hawkins, 1987; Shappell and Wiegmann, 2000). All participants attended the same training event and subsequently returned to their normal operational duties.

Three surveys were administered to the same participant cohort: immediately before training, immediately afterwards, and two months later. Research time constraints meant that a longer initial follow-up period was not possible. Surveys included Likert-scale items and open-text questions exploring perceptions and operational use of HF concepts. The final survey invited participants to describe incidents where HF principles had been applied.

To triangulate the survey data with perspectives from sectors with established HF practice, two lengthy and semi-structured interviews were conducted with experienced aviation HF specialists: a Royal Air Force officer and strategic HF leader, and a Senior Inspector of Air Accidents from the Air Accidents Investigation Branch (AAIB). Interviews explored application, transferability, leadership responsibilities, cultural enablers and systemic considerations relevant to policing.

Quantitative survey data was analysed using descriptive statistics including frequencies, percentages, means and standard deviations. Inferential statistics were not applied due to the exploratory nature of the study and small sample size. Qualitative survey responses and interview transcripts were analysed separately using Braun and Clarke's (2006) six-phase thematic analysis.

Results

Where quantitative Likert scales are used, these follow a 5-point ordinal scale (1 = Not at all, 5 = Extremely) which enabled the calculation of descriptive statistics including mean (M =) and standard deviation (SD =).

Baseline Familiarity with Human Factors (Survey 1)

Pre-course responses indicated minimal prior exposure to Human Factors (HF) concepts within routine policing practice. The officers reported very low familiarity with structured HF terminology, error models and systems-based approaches. Awareness of concepts including cognitive workload, fatigue, graded assertiveness and Just Culture was limited, and no participant reported previous HF training or aircrew experience.

Immediate Training Impact (Survey 2)

Immediately after the training, participants reported strong confidence in their understanding of Human Factors concepts (M = 3.87, SD = 0.55), with 78% rating themselves "Very" or "Extremely" confident. Perceived ability to apply HF operationally was similarly high (M = 4.52, SD = 0.66), while perceived general relevance to frontline policing received the strongest response (M = 4.78, SD = 0.73), with 91% selecting the highest rating category. Participants also believed HF had clear potential to improve operational outcomes. Perceived likelihood of error reduction was strong (Figure 2) (M = 4.54, SD = 0.66), while perceived improvements to officer safety (Figure 2) were even higher (M = 4.63, SD = 0.58).

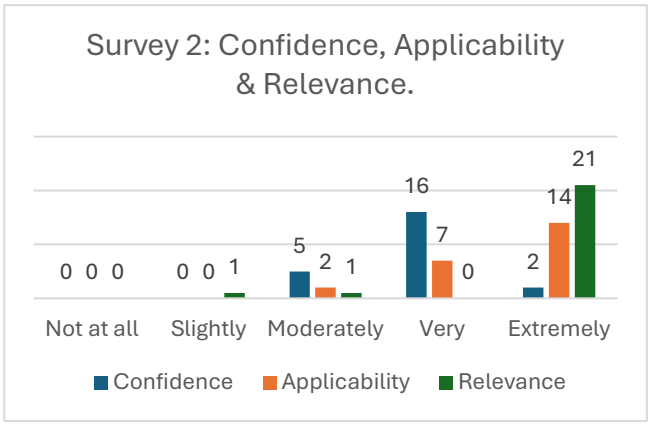

Figure 1. Survey 2 results: confidence, applicability & relevance

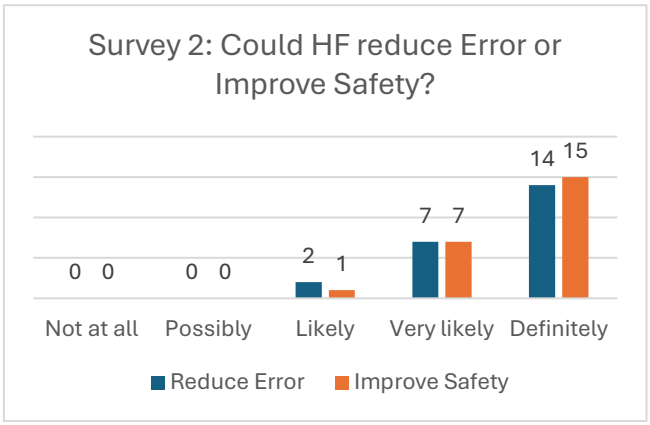

Figure 2: Survey 2 results: Could HF reduce error or improve safety?

Even with their increased understanding, participants maintained that HF was absent from policing (Figure 3). When asked to what extent HF principles were embedded within police training and policy, most respondents (87%) selected the lowest response categories (M = 1.74, SD = 0.81), with even lower ratings for misconduct and adverse incident investigations (M = 1.22, SD = 0.52).

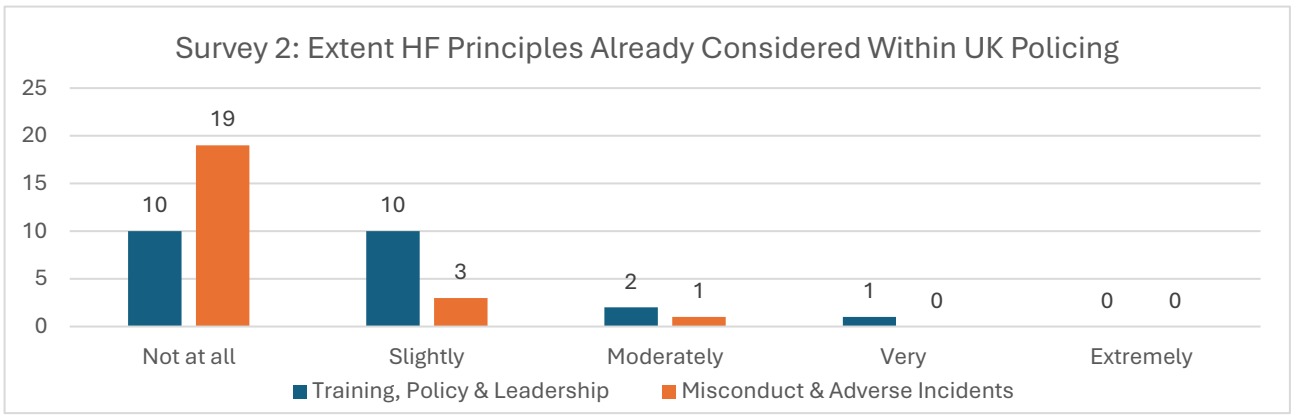

Figure 3: Survey 2 results: extent HF principles already considered within UK policing

Qualitative questions prompted reflections following the course. Fatigue, situational awareness, stress management, and Just Culture were identified as most useful topics. The officers valued

learning about the effect burnout has on mistakes, and the distinction between different types of error. The participants in leadership roles, expressed greater understanding of their officers' stress and fatigue, and the implications for performance. There were no themes with 'least useful' concepts, with most participants not identifying anything at all for that question.

Some participants recognised elements such as 'Red Mist' (also known as tunnel vision) from their police training. A minority identified partial HF references in other learning, such as the concept of situational awareness or communication skills during Taser or leadership training. Although some officers had encountered fragments of the material in other contexts, all participants indicated that most of the HF content presented, was not something they had previously been taught.

Most participants (18 of 23) recalled historic incidents from their careers where they felt that HF could have made a difference. Examples included communication breakdowns, colleagues affected by stress that was not recognised by supervisors, and risks being overlooked at incidents. Some participants referenced serious incidents in which Human Factors appeared to have contributed to the outcome. Two participants independently referenced different misconduct cases, where they felt HF could have prevented the relevant incident.

In qualitative response boxes, several participants used the space to advocate for the rollout of HF across policing. Course improvement suggestions included more group work, more policing-specific examples, and roleplay exercises to practice cognitive overload. Several participants suggested a separate course for supervisors.

Operational Application and Cultural Diffusion (Survey 3)

Eighteen of the original twenty-three participants completed the two-month follow-up survey. Of these, 89% reported having applied or used Human Factors principles in operational contexts, in the short window since attending the course. Reported frequency of use varied, with 39% stating they used HF "most days" and 6% "every day" ($M = 3.11$, $SD = 1.13$). Knowledge sharing was also evident; 78% of respondents reported discussing HF concepts with colleagues, suggesting early peer-to-peer diffusion beyond the trained cohort.

Participants were asked if they felt HF had improved officer safety or reduced the risk of mistakes. For both safety ($M = 3.83$, $SD = 1.29$) and mistake reduction ($M = 3.56$, $SD = 1.38$), results were again positive. Two-thirds of participants (67%) believed the training had 'moderately' or 'definitely' improved safety, and half (50%) believed it had similarly reduced the risk of making mistakes. One participant however, felt it had not at all reduced their likelihood of error.

The final qualitative reflections were overwhelmingly positive. The responses demonstrated a greater understanding and awareness of the officers' own capabilities and those of their colleagues. Participants in leadership roles described taking a new approach to their staff and better understanding their concerns and anxieties. Other participants reported increased openness to challenging others and being challenged, as well as reduced inter-team conflict. Specific references were made to a need to overhaul how officers' actions are judged. Several participants reported that they had already recommended the course to colleagues, and (14 of 18) explicitly chose to say that HF training should be introduced for all officers. None of the feedback was negative or argued against the introduction of Human Factors in policing.

Most (14 of 18) participants had meaningful specific examples of using HF since the course, and many in a serious or impactful way. These include an officer recognising burnout and seeking earlier support to deal with a volatile incident, and another resisting the urge to rush alone into a crowded public order incident and taking a calculated and safer approach instead. Half the participants identified a greater understanding of the effect their personal stressors and mood has on their interactions with colleagues and the public. One officer reflected in depth on a high-risk

incident involving a suicidal person at height for several hours, describing how HF principles enhanced their situational awareness and helped them regulate the effects of stress and fatigue.

Two different participants independently reported reduced effects of empathy fatigue, and a better approach to repeat victims of crime including domestic violence. Concerns regarding existing investigative and accountability processes were raised by several participants. Two specifically argued that the application of HF principles could reduce the number of misconduct investigations and referenced what they described as a tendency within policing to respond to issues by prohibiting behaviours rather than analysing contributory factors. One participant did observe difficulty in recalling some detail from the training day but acknowledged this would improve if training was repeated and formally adopted.

Aviation Specialist Perspectives

Both aviation specialists described Human Factors (HF) as highly transferable to frontline policing. They identified clear parallels between the operational environments, particularly in relation to decision-making under pressure, communication, teamwork, stress management and fatigue. The AAIB participant reported that the most likely benefit realised by policing would be improved officer decision-making quality. The RAF participant noted that HF training is routinely delivered across a wide range of aviation roles beyond pilots, including air traffic control and force protection, suggesting that HF frameworks can be successfully adapted across diverse operational contexts.

Both specialists emphasised that the effectiveness of HF depends on the principles being embedded throughout an organisation and its hierarchy. In aviation, both participants said HF is introduced early in training, reinforced through recurrent education and formal assessment, and is supported through leadership, accountability and structured reporting systems. They cautioned that where organisations focus primarily on blame following adverse events, individuals may become reluctant to report risks or mistakes, limiting opportunities for organisational learning. Instead, investigative approaches in aviation typically begin by examining system conditions, training, procedures, supervision and organisational influences before assessing individual actions.

The AAIB participant described how aviation training includes structured intervention phrases designed to provide a professional and clear way to interrupt error progression, giving the example of a direct challenge statement used to create a psychological break during critical moments: “Captain, you must listen”. The RAF participant described processes within the air force which allow for clear and quick reporting of safety risks which bypass hierarchy and red tape. Their description aligned with CHIRP as described earlier.

Discussion

The initial survey responses also showed that structured HF principles were largely absent from UK policing, including training, culture and accountability. This aligns with existing literature describing a perception of blame culture and limitations in organisational learning (The Police Foundation, 2018; Tomkins, 2020; Farrow, 2024a, 2024b). While immediate post-course ratings of relevance and applicability were extremely strong, the high proportion of officers reporting application at follow-up (89%) demonstrates that the training resonated beyond conceptual endorsement and translated into practical application. Participants reported meaningful behavioural application, demonstrating positive effects on safety awareness and decision-making.

Qualitative responses included accounts of officers applying HF at serious incidents and seeing some benefit, which underscores the relevance of HF to frontline policing. The elements cited as most useful, are foundational components of high-reliability practice and align with established

system-based models of error (Reason, 1990; Shappell and Wiegmann, 2000). The examples demonstrated the practical application of HF principles which align with key components of CRM and aviation-based HF (Kanki, Helmreich and Anca, 2010; Civil Aviation Authority, 2023). Participants described regulating responses under stress, adjusting communication behaviours during volatile incidents, and reconsidering how risk and accountability are framed. These accounts indicate not simply knowledge acquisition but improved self-awareness and early behavioural and cognitive integration.

Participants' reflections suggesting that Just Culture principles could improve accountability and reduce misconduct align with specialist accounts that blame-focused systems inhibit reporting and obscure systemic contributors to error. This is consistent with research identifying perceived blame culture within policing (The Police Foundation, 2018) and evidence that fear of blame can shape officer behaviour and decision-making (Heaton, Bryant and Tong, 2019; Farrow, 2024a, 2024b). HF and Just Culture emphasise the examination of contributory organisational factors, including supervision, resources, equipment, and procedural design, alongside individual actions (Dekker, 2016; Reason, 2016). Frameworks such as the FAIR3 model (Baines Simmons, 2022) provide a systematic approach to examining intent, context and contributory factors behind adverse events. Adoption of a comparable model within policing would address officers' concerns that HF considerations are largely absent from internal investigations and strengthen prevention by examining the conditions in which incidents occur rather than focusing solely on individual attribution. Such approaches would also align policing more closely with the system-oriented investigative practices described by the aviation specialists.

Specialist interviews identified the aviation use of a formal "critical phrase" to interrupt escalating risk and overcome hierarchical barriers. Adaptation of a comparable critical phrase mechanism may merit evaluation within operational policing, to provide officers with a way to make a professional intervention. Finally, concerns regarding blame-focused responses to error, identified both in prior research and in participant reflections, align with specialist accounts that fear of attribution can suppress reporting of emerging risks and system vulnerabilities. Where there is not a suitable system to enable reporting, organisations have reduced visibility of latent conditions. As reviewed in this study, CHIRP (2025) provides an example of a confidential, non-punitive mechanism designed to capture safety-related issues that fall short of formal near-miss or accident thresholds. A comparable, HF-informed feedback channel in policing would benefit from further evaluation.

Overall, the findings indicate that aviation-derived HF principles are highly transferable, operationally meaningful, and culturally resonant with the operational realities officers face. Officers did not describe abandoning established practice; rather, they reported enhanced awareness, clearer communication, and more deliberate decision-making under pressure. The evidence demonstrates that structured HF adoption has credible potential to strengthen performance, safety, and systemic resilience within policing and potentially across other frontline emergency services.

Conclusion

This study provides the first empirical examination of Human Factors integration within general frontline policing. Delivery of an established aviation HF course to operational police officers demonstrated high perceived relevance, sustained behavioural application over time, and early evidence of cultural diffusion. The findings indicate that aviation-derived HF principles are transferable and operationally meaningful within routine policing contexts, with potential to enhance officer and public safety, strengthen decision-making under pressure, and support more effective organisational learning.

The results also highlight several practical implications. Structured Human Factors training may provide officers and supervisors with tools to improve safety and reduce mistakes and adverse incidents. Adoption of system-oriented investigative approaches, such as the FAIR3 behaviour assessment framework, may also support more balanced examination of adverse events by considering organisational conditions alongside individual actions. Finally, the development of confidential, HF-informed reporting mechanisms could improve identification of emerging risks and organisational vulnerabilities.

The study is limited by its modest cohort size, reliance on self-reported outcomes, and relatively short follow-up period. Larger multi-force studies, longer evaluation periods, and incorporation of objective performance indicators would strengthen understanding of long-term operational impact. Nevertheless, the results establish credible feasibility and provide an empirical foundation for structured exploration of Human Factors integration within policing and potentially across other frontline emergency services.

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