

Development of expertise in detecting terrorist threats at airports

*Xi Liu, Alastair Gale, & Kevin Purdy
Applied Vision Research Centre,
University of Loughborough, UK*

Abstract

The visual and cognitive factors that underlie the initial development of expertise in the visual inspection of X-ray images of air passenger luggage were investigated. An experiment is reported where naïve observers searched 50 X-ray images of air passenger luggage for potential terrorist threat items. For each image their eye movements were recorded remotely and they had to rate their confidence in whether or not a potential threat item was present. Data were analysed in terms of detection performance and also in terms of visual search factors and the results are discussed in terms of the development both of expertise and of appropriate cognitive schemas.

Introduction

Recent concern about aviation security has focused on airport security screeners in detecting weapons and other potential threats. In order to understand the development of skilled performance of these personnel in searching X-ray images of air passenger luggage, it is important first to understand fully the requirements of the task and consequently the visual and cognitive factors underlying the inspection of these complex images were examined.

The experiment reported here uses eye position recording of naïve observers as they search X-ray luggage images for threat items such as; guns, knives and improvised explosive devices (IEDs). The purpose is to understand the factors underlying expertise in X-ray scanning

Method

Participants

Ten naïve participants (four female and six male), who had no prior knowledge of examining such X-ray images, took part in the study.

Stimuli and Apparatus

Each participant examined fifty X-ray images. Twenty-five were of normal luggage items. The remaining images contained potential threat items, including; guns, knives

In D. de Waard, K.A. Brookhuis, and A. Toffetti (Eds.) (2006), *Developments in Human Factors in Transportation, Design, and Evaluation* (pp. 329 - 332). Maastricht, the Netherlands: Shaker Publishing.