



The Evolution of Bloodstain Pattern Analysis

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DESCRIPTION

The study and analysis of bloodstains at a known or suspected crime scene in order to draw conclusions about the nature, timing, and other details of the crime are known as "bloodstain pattern analysis." It is primarily used to investigate homicides and other violent crimes involving blood, and it can aid in crime scene reconstruction. Since the late 1950s, BPA experts have claimed to be able to use biology, physics, and mathematical calculations to accurately reconstruct events at a crime scene, and these claims have been accepted by the US criminal justice system. Since the 1990s, the validity of bloodstain pattern analysis has been called into question, and more recent studies have cast significant doubt on its accuracy.

A comprehensive 2009 National Academy of Sciences report concluded that the uncertainties associated with bloodstain pattern analysis are enormous and that purported bloodstain pattern experts' opinions are "more subjective than scientific. The report cited several instances of blood spatter analysts exaggerating their qualifications and questioning the reliability of their methods. The largest-to-date study on the accuracy of BPA was published in 2021, with results "showing that they were frequently erroneous and often contradicted other analysts.

Although bloodstain pattern analysis has been used informally for centuries, the first modern study of blood stains was conducted in 1895. The University of Kraków's Dr. Eduard Piotrowski published a paper titled "On the formation, form,

direction, and spreading of blood stains after blunt trauma to the head." His first experiments were conducted on rabbits. A number of publications were published describing various aspects of blood stains, but his publication did not result in a systematic analysis. Homicide Investigation by Lemoyne Snyder also briefly mentioned details that later bloodstain experts would expand on. Bloodstain pattern analysis was used to reconstruct a shooting incident in a 1952 episode of the police procedural radio series *Dragnet*.

A bloodstain can appear differently depending on the situation and the material on which it appears, and bloodstains on porous surfaces, such as fabric, can be difficult to examine and may be distorted. Analysts of bloodstain patterns consider the angle of impact to determine the source and amount of force behind it. Changes in external forces can cause satellite drops.

Finding the "area of convergence" for the blood droplets can help bloodstain analysts determine the point of origin. To determine this point of origin, the shape and length of the blood are frequently considered, and the stringing method is used. This method entails drawing lines from each blood splatter and locating the point where all of the blood intersects. Furthermore, the angle of impact and other external factors, such as the material on which the blood falls, can alter the shape and size of the blood. The location of the impact can alter the shape of the bloodstain. Bloodstains may become elongated rather than retain their original shapes. In these instances, the blood may have a tail that can indicate directionality.

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