Connecting Aesthetic Judgment and Situational Awareness: Multimodal Decision Making on the Fireground

Valerie Ingham
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Abstract: Through an investigation connecting the aesthetic judgment of artists and the situational awareness of Incident Controllers on the fireground, Multimodal Decision Making is developed as a challenge to the position that aesthetic forms of awareness are unsophisticated and inferior sources of knowledge. The effect of most decisions made by Incident Controllers when coordinating an operational response to a fire are irreversible, yet they must be made under time-pressure, often on the basis of conflicting and incomplete information. In such a fast paced, time-pressured environment, I propose that Incident Controllers are basing their decisions on more than scientifically verifiable measurement and calculation. I maintain that they are aesthetically attuned to reading the fireground in the same way as an artist makes decisions concerning image construction and art criticism. This paper introduces one fireground incident, the House Alight, in order to demonstrate how Multimodal Decision Making enables the explanation of decisions previously thought illogical and of no sound basis. N.B. Inspector is a rank title, and Incident Controller is the role they perform when directing fireground operations.

Keywords: Decision Making, Situational Awareness, Fire, Emergency, Artistic Practice

Drawing Decision making on the Fireground into an Aesthetic Arena

MY BACKGROUND INVOLVES practising as both an artist and as a lecturer of Emergency Management. This experience has led me to connect these two previously disparate fields and to shape my research with a multimodal approach. The result is the emergence of aesthetic realisations concerning decision making on the fireground by Incident Controllers, which I term Multimodal Decision Making.

Multimodal Decision Making is a holistic approach to recognising the importance of artistic perception and aesthetic awareness when contradictory and incomplete information has to be processed quickly, as on a fireground. It is distinguished from formal rationality and informal sense-based rationality in that it approaches art, science and practice as an irreducible whole.

The benefit of recognising a connecting theoretical positioning between art and firefighting is the enriching and the heightening of alternative explanations and the encouragement of a decision making discourse which would otherwise remain within the framework of a ‘science’.

Aesthetic judgment is the place where disciplinary boundaries melt and new connections and networks electrify in an instantaneous moment of insight. Incident Controllers responding to the live image of a fire must read the image immediately and, given their available resources, decide the most appropriate course of action. Against the backdrop of the visual and the artistic, the image Incident Controllers on the fireground work with, work on, mould
and shape, consists not only of the fire itself, but of the situation as a whole—incorporating risk, danger, sparse pieces of conflicting information and the pressure to respond rapidly.

Firefighting is overwhelmingly described and researched as a ‘science’. For example, much attention has been paid to the way fire will behave in the presence of certain elements and substances in terms of predictions of flashover, backdraught, rollover and air flow. These important advances are firmly based within the scientific framework of testing and measuring for effectiveness, and documented as ‘objective’ facts. Within firefighting organisations the positivist-scientific worldview and its attenuate vocabulary of measure and report are dominant. Credibility is established through successfully negotiating a framework of rigid structure and measurable outcomes.

The challenge, when approaching from another direction, is to emphasise and acknowledge the non-verbal processes which involve a depth of field far beyond a mathematical calculation of probability and risk. I focussed on documenting something elusive and intangible, yet nevertheless strong in the Incident Controllers reflections upon their decision making. I did this through appropriating some of the language of art criticism, visual sociology and arts-based research. Sullivan (2005) echoes the perspective of moving beyond previously established boundaries:

There is a desire to move beyond discipline boundaries and into areas of inquiry that interact and intersect and require new ways to conceptualise forms and structures (Sullivan, 2005, p. 152).

One reason for adopting an aesthetic framework in the study of such a ‘scientifically’ recognised enterprise as firefighting, is that the legacy of the long-running debates in art and aesthetics provides recognition of the ineffable and a semblance of language with which to discuss gut feelings and intuition in a far more developed sense. Within aesthetics it is possible to theorise about the unseen, but felt; the known, but inexpressible. This is made possible through utilising a framework which favours embracing the whole of the work, holding in tension its many facets, rather than dissecting each incident into parts for coding and subsequent analysis.

**Situational Awareness**

Incident Controllers are inundated with information on the fireground- people screaming and shouting, conflicting reports of people trapped, multiple radio messages and simultaneously they are mandated to ensure the safety of fire crews through their constant reassessment of the dynamically changing situation before them. They notice what they have been trained to observe, for example smoke escaping from under the eaves, melting rubber between tilt-slab walls, and cracks in structural concrete. Their aesthetic judgment of these indicators and signs helps them to gauge and measure the progress of the fire, actively informing their decision making process. Indeed, they must act quickly to decipher what is pertinent to their firefighting plan, sifting out what will distract their attention and waste valuable time. Firefighters refer to this process informally as ‘size-up’, but more formally it is defined as ‘situational awareness’.

According to Foster (2006) the term ‘situational awareness’ was first used by pilots in World War I, and more accurately described as ‘positional awareness’ while they were airborne and fighting. Years later when other factors were taken into consideration, such as
“aircraft capabilities and known battle tactics” (p.1), it was more accurately referred to as situational awareness, and sometimes situational assessment. The current understanding of situational awareness according to Endsley (1988), a seminal writer and researcher in the field, is:

The perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future (Endsley, 1988, p. 97).

Foster (2006) uses the terrorist attack on the World Trade Centre to demonstrate the role of experience in developing our own situational awareness. When the first plane struck he asks “What did you think?” and according to Foster most people were wondering what human error caused the crash. By the time the second aircraft crashed “We knew we were under attack…The additional information of the second aircraft altered our perception of the first crash” (Foster, 2006, p. 2).

**Theoretical Underpinning**

In a study which links situational awareness and aesthetic judgment, the theoretical underpinning needs to encompass art and aesthetics as both a practice and an experience. An understanding of art as simply an object or an image or even an event, with disregard for the processes entailed in its making and reception, is not productive. Therefore the theoretical underpinning is strongly associated with Dewey’s understanding of “Art as experience” (1934). Dewey does not distinguish between an art-generated aesthetic experience and a general, everyday life, unexpected, aesthetic experience in that “All experience can be treated in an artful manner, not just those portions that are confined to specific spheres of life” (in Jackson, 1998, p.123). Likewise, the art educator Elliot Eisner (2002) understands:

Any practice whatsoever can have aesthetic or artistic qualities. This includes three-year-olds building castles in the sand as well as surgeons engaged in a life-sustaining operation (Eisner, 2002, p.xiv).

What this study seeks to document is something so obvious that it is elusive; we see right past it, yet without it we cannot function. Eisner refers to this as “Those forms of understanding that resist dissection and measurement” (1985, p.71). Sullivan describes a similar thought:

Artists cast their minds to issues, ideas, and experiences that reveal imaginative insights, yet the process resists capture by the freeze-frame of clinical analysis. Art practice cannot be reduced to standardized dichotomies of cause and effect, input and outcome, or process and product (Sullivan, 2005, p.146).

Today there is a ground swell towards a holistic approach being experienced in various disciplines. For instance Taylor (2002), with regard to physical therapy, argues for a new philosophical foundation and an integrative approach encompassing the physical, emotional and intellectual body. Another investigation, conducted by Eisner and Powell (Eisner & Powell, 2002), explores the “artistry in the practice of research in the social sciences”. In this study, participants (all postgraduate research science students) were asked about their
‘ah ha’ moments of discovery and insight. Connections were then drawn between scientific moments of insight and “aesthetic forms of awareness and artistic modes of thought” (p.131).

Scientificising the way decisions are made on a fireground is an unrealistic approach to describing fireground decision making. I argue that in these complex situations it is impossible for the Incident Controller not to be aesthetically involved, and that this is a compelling and important aspect of fireground management, and one that cannot be quantified or measured objectively. Multimodal Decision Making highlights the aesthetic judgement of Incident Controllers as integral to their decision making processes.

**Conducting Multimodal Research**

In an effort to encourage awareness of aesthetic judgment in a domain previously perceived of as a ‘science’, data analysis was approached from a multimodal perspective, holistically embracing aesthetic experience. It is an integrated approach in which any highlighted individual points are deemed distorted and meaningless on their own. Therefore I did not make categories through assembling codes across incidents. In the data analysis I sought to be multimodal- to avoid the list, the sequential ordering, the search and matching for codes across incidents. I endeavoured to maintain a multidimensional view of the incident itself, aiming to preserve the integrity of each incident as a whole.

I used my own judgment to offer explanations. Eisner says “If researchers have no consciousness of what is significant in a setting, it is unlikely that anything subsequent will occur that is of interest” (Eisner, 1998, p.230). As I had no preconceived ideas as to what I would find in the data I let it speak to me. My role was to recognise what was important and be able to justify why:

This way of treating information resembles the work of a critic who cannot know in advance which particular qualities a specific work of art or literature, or music, or dance might display, yet is responsible for recognizing what is important in the work and justifying his or her judgments if asked (Eisner & Powell, 2002, p.136).

In the original study (Ingham, 2009) twelve participating Inspectors from a large Australian firefighting organisation were interviewed. In this paper I present certain aspects from one incident, the House Alight, drawing connections between artistic practice and the aesthetic judgment of an Incident Controller on the fireground.

**Fireground Case Study: House Alight**

A house on acreage in the country is reported alight with a possible person trapped. As the participating Inspector travels towards the scene he sees a huge orange glow on the horizon and immediately wonders how a house fire could fuel such a blaze. As the Inspector approaches the fire he is amazed at the spectacular colours and size of the flames:

The house, it was just raging. I’ve seen some house alights, but this was just like it was breathing, it was just like pulsing and going and going like anything…The house was just going so well on fire we weren’t going to stop it. Actually we just had to let it burn out… it was just amazing to see this house go.
It was pulsing, you know. There was orange gunk and blue flame and green flame and yellow flame and you could see it really moving and so I realised there was fuels in there and that type of thing, and anybody in that part of the building is going to be fried, let alone dead from the smoke.

The House Alight Inspector’s most immediate thoughts were on the information of a person trapped. Ultimately, there was no one, but he did not find this out until the next day. Had there been, he was quite convinced they would not have had a chance of surviving the smoke, let alone the intensity of the flames.

It appears that an aluminium garage had been bricked and plastered up, effectively turning it into a house. A large amount of flammable substances, such as paints and thinners, were stored inside.

It was a miniature factory so if you get a miniature factory, what happens with a metal roof is it buckles. It loses two thirds of its strength at 600 degrees so with other weight on it, it just buckles in, so it is very hard to get into the factory once you lose the roof because you’ve got these pockets in there and that’s what we had in this situation – a miniature factory basically. The metal roof had caved in and we couldn’t get close enough because of the instability of the brick walls.

In the meantime there was a house immediately next to it, within about two to three metres on the side furthest away from the fiercest part of the fire, what we call Exposure D. And it was a timber front house only partly constructed, so we concentrated the firefighters’ hoses and efforts on saving that.

So the metal roof buckled, collapsed, and fell in and then the sides buckled and sort of fell in and fell out, and the bricks and that sort of fell off. Out here this whole back brick wall just completely crashed right down to the base (points to his drawing, called a mudmap in fire services and presented as Figure 1).

**Drawing up: Spectacular and Impressive**

During the interviews, participating fire officers were given the opportunity and materials to draw the incidents they were describing. Allowing the data to become visual clarifies and distils reflections that might otherwise never make it to the surface in verbal explanation.

In addition to this, I was helped greatly by the visual images - not only in the formal data analysis stage of the research, where they increased my “idea generation” (Leavy, 2009, p.232), but also during their actual construction in the interview. In other words, through their drawings the Inspectors were able to get on with relating their incident and not be waylaid by having to explain details which became immediately obvious to me once drawn. In this way, the mudmaps helped to visually explain some complex concepts and relationships through representing spatial relationship, distance and time.
In the House Alight mudmap (Figure 1) the written words of the Inspector dominate his depiction of the scene in that they stand out in contrast to the lines indicating the building. This may reflect the Inspector’s lack of confidence in my ability to ‘get the full picture’ as he has drawn it, or perhaps it is in his nature to clarify and clearly express, leaving no room for doubt when I later start looking more closely at his drawing. These are speculative thoughts, and I include them because from a multimodal perspective they are enriching and important contributions to the various interpretations of his incident data.

In his mudmap the House Alight Inspector has ‘written in’ the fire with the words “totally involved heavy fire” and “involved”. Close inspection reveals a tanker “relaying” water to a pumper, the presence of hazmat (hazardous materials) and a Breathing Apparatus (BA) staging area, and “1 x 38” meaning the diameter of the line of hose is 38 mm. A rough timeline crosses the top of the image indicating that the incident lasted long enough for him to order a fixed line of hose to cool the structure and make arrangements for refreshments. One caravan was salvaged, depicted by a dotted line and the words “caravan removed”. At the bottom of the mudmap we see that a Retained Captain was appointed Safety Officer.

The concept that drawing is a ‘language’ requiring ‘translation’ was heralded almost a century ago by Sargeant (1912):

Drawing is a language, a mode of reproducing ideas, and as such is a means of forming and developing these ideas….Drawing thus becomes a tool with which to think. To draw an object requires a mental activity comparable to that which occurs when a thought is translated from one language to another (Sargent, 1912, p.5).

When at work on a fireground, Incident Controllers also draw mudmaps on their tactical worksheet. Apart from becoming legal documents, these worksheets are used to visually demonstrate the relationship between the elements on the fireground - the crews, the appliances, various built structures, roads and so on, as a support to their judgment and decision making. These spatial relationships would take up valuable time and would be more difficult to grasp if depicted in words. In a similar vein Eisner writes:
We use maps because they display, by a structural analogue, relationships in space that provide a useful image of the world we wish to navigate…they help us to notice and understand a particular environment and our place in it (Eisner, 2002, p.11).

• The depictions in a mudmap constructed on a fireground simplify the fireground scene for two specific purposes. Initially they contribute another dimension to the Incident Controller’s spatial understanding on which to base their plan of fire attack; ultimately, they serve as a lasting and legal record supporting their judgments and consequent decision making.

**Blocking in: Securing the Scene**

I propose an aesthetic correlation between detecting difference in terms of balance and colour harmony in the early stages of the construction of an artwork and in the artistic and aesthetic awareness of moving flame, smoke and burning materials.

As an artistic strategy, blocking in enables a sense of balance and purpose at the start of a work and lays down the initial broad compositional development of a painting. Roughly conceptualised, it is the process of building up the painting from the general to the particular, with increasingly refined detail. This progression is accompanied by aesthetically informed feelings around the compositional balance and movement of the painting, and whether it is working and holding together as a whole.

Not all artists use the technique of blocking in; one who does is Barbara Bolt, a practising artist and lecturer in Visual Media at the University of Melbourne. She writes of the experience:

For the purpose of my argument I want to recall the process of the painting. At first the work proceeded according to established principles of painting practice – blocking in the shapes, establishing a composition, paying attention to proportion and the shapes of light and dark – a re-iteration of habits and strategies of working. However, at some indefinable moment, the painting took on a life that seemed to have almost nothing to do with my conscious attempts to control it. The “work” (as verb) took on its own momentum, its own rhythm and intensity. Within this intense and furious state, I no longer had any awareness of time, of pain, or of making decisions. In the fury of painting, rules give way to tactics and the pragmatics of action (Bolt, 2004, p.1).

Bolt’s words “rules give way to tactics and the pragmatics of action” identify her as an expert practitioner. The close following of guidelines is an indication of the novice, while an experienced practitioner has imbibed and become familiar with the principles of practice to such as extent that they are able to employ them without consciously retrieving them (Bonner, 2001). In a sense this frees them up to move beyond a mechanistic action towards greater depths of understanding.

It is during the early stages of blocking in that the expert practitioner might recognise when something is not quite right. A less experienced person, still developing their skills, style and technique, may continue without noticing for some time, when it becomes increasingly obvious that something is not actually working- in that it is causing problems and stopping progression to the next stage of the work.
I propose that blocking in for an artist is the same in aesthetic essence to the beginning stages of a fireground incident when the Incident Controller designs and maps out the placement of crews, appliances and other available resources. The composition may change as the incident progresses, new information may be exposed, the design may require altering, more resources may be called for, but these decision points are informed by an aesthetic, situational awareness of the scene and what actions would best contribute to its resolution.

The House Alight Inspector, through his situational awareness, his aesthetic judgment, of the scene before him, ‘blocked in’ the fireground by his placement of fire crews and appliances.

**Closure : Scanning for Suggestions**

Incident Controllers make decisions under time pressure with sparse and conflicting information, given the immediacy and transience of a fire, where claims to know anything may be speculative. Artists and Incident Controllers alike are relying on closure to ‘fill in the gaps’.

Closure is a common technique utilised by artists and it means to suggest, but not fill in, every detail necessary. The viewer is required to fill in the missing parts in order to complete their understanding, and with it a fuller perception of what is being viewed. A very simple example is provided in Figure 2.

![Figure 2: Closure. Deciphering the Image requires the Viewer to ‘fill in’ the Missing Parts](image)

The House Alight Inspector experienced tension, not knowing whether there was a person trapped inside the burning structure or not. The information he received at the scene was slightly garbled and inconsistent. He also tasked himself with keeping the surrounding properties and exposures from catching alight. In the end, the firefighters managed to save one caravan and some of the cars:

And we got a message from the neighbours and police information that a suspicious car had been in the driveway and out of the driveway and this bloke had had a fight with his missus and moved into this place, no no, sorry and she’d gone away and he’d gone north two days ago or something. So we had all this conflicting information as to whether he was actually even in the town, let alone in this house. So I decided that of course if he was in there he was gone, and we can’t save him and we just had to then just concentrate on waiting until the fire basically burnt itself out and protect this exposure, Exposure D.

The House Alight Inspector’s transcript indicates that there was “conflicting information” in that there were gaps and pieces missing. Who was trapped and who had left town, the man or his wife?
Multimodal Decision Making understands that fireground Incident Controllers such as the House Alight Inspector, when faced with time critical situations and unclear, conflicting and contradictory information (for example conflicting messages concerning missing persons), are practising a form of closure. In the House Alight the Inspector ‘fills in the gaps’ through his experience of heat and smoke, and realises that whoever they were inside- whether man, woman, husband or wife- they were deceased.

**Multimodal Decision Making**

There is an underlying assumption made by emergency service personnel and the public alike that if the risk is known, it will be acted upon in a logical and rational manner. In relation to firefighting organisations this leads to the understanding that there can be such things as impersonal reports, controlled observation, and impartial assessment. The arena of the arts, by contrast, easily acknowledges a combined and colourful image of art and science:

The world as a set of structured systems does not divide into the two territories of scientific and artistic vision. Rather, both our scientific understanding and our artistic grasp of the physical world exist within a common structure of motivation, communications, and knowledge (Kepes, 1965, p.vii).

Through focussing on the artistic dimensions of fireground situational awareness, Multimodal Decision Making contributes an aesthetic perspective which poses a challenge to traditional concepts of decision making, where a ‘decision’ is understood in terms of logic, rationality and a selection between options (Dowie, 1993).

Despite the postmodern atmosphere, in contemporary Western society there remains the legacy of modernism in the idea that art is a liberating and free activity, while technology is “mechanical, constraining and subject to rote and rule” (Wartofsky, 1979, p.338). Within the modernist construct, art is understood to be original and imaginative, while technology is thought of as an acquired skill learned through training:

Technology…is not the alternative, or conflicting model to that of art, but is a part of what a viable model of art contains; conversely, the aesthetic, the explorative, the creative is what a viable model of technology contains. Far from conflicting, these are complimentary models of a unified mode of human activity (Wartofsky, 1979, p.355).

Multimodal Decision Making challenges the understanding of firefighting and decision making as a science-based practice, transcending it to a higher dimension. Without acknowledgement of the concept of Multimodal Decision Making, decision making on the fireground faces the same dangers as nursing:

A rampant and unchecked technical rationality poses a threat to nursing or any practice discipline because it can quickly become a totalizing and enframing orthodoxy, a template to be squeezed down on top of all thought and practice until uniformity is achieved (Darbyshire, 1999, p.131).
Post Incident Debrief

I propose that fireground decision making is intimately informed by aesthetic awareness and that the experience of Incident Controllers, finely honed through years of practice, is expressed through their expert reading of the scene.

I argue that despite the ways in which situational awareness is logically and rationally articulated within the ‘science’ of firefighting and consequently understood as ‘fact’, that without aesthetic judgment the situation cannot even begin to be apprehended. A fireground is a complex situation, not effectively described or explained through a linear, cause and effect sequence. It requires recognition of the entirety of the scene and an aesthetic perception which moves beyond verbal description.

In essence, Multimodal Decision Making acknowledges the importance of aesthetic awareness in the recognition of patterns, spatial awareness and the reading of differences. These aesthetically informed elements contribute to decision making in time-pressured situations, facilitating the anticipation and recognition of the unexpected, and discrepancies and variations as the fire progresses.

The foundational assumptions underlying decision making on the fire ground require deeper critical inquiry. This paper introduces the concepts of drawing up, blocking in, and closure, as introductory illustrations of aesthetic judgment on the fireground and as a platform from which a new philosophical foundation for decision making can be initiated, one that integrates the current scientific perspective into a holistic, multimodal perspective.

References


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