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A Communications Perspective on the Use of Visualisations in a Dutch Court for Minor Felonies

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1. Introduction

On 25 April 2016, in Utrecht, the Netherlands, two suspects are accused by the public prosecutor of demolishing and attempting to steal a moped. The case is handled by one judge at the court of justice in Utrecht, a major city in the Netherlands.[1] The public prosecutor reads her indictment and suggests starting the hearing off with video footage, which, she says, will make it very clear what this case is about. The prosecutor, two suspects, two lawyers and the judge gather around a laptop that is placed at the front of the courtroom. The laptop faces the public; the participants face the laptop. The public prosecutor explains that a moped was placed in a strategic spot by local law enforcement where multiple mopeds had been stolen in the previous months. Law enforcement then waited for a group of youngsters to arrive and filmed what happened. The public prosecutor starts the (night time) video recording and explains who is who, pointing out the two suspects at trial. Sometimes the public prosecutor pauses the video recording and explains what happens. Throughout the video, the judge asks the suspects some questions, including: 'is this you?' One of the suspects replies that he cannot remember if this is him. At the end of the recording the judge states: 'I have seen and recognised you', referring to the two suspects. At the end of the trial, which lasts approximately one hour, the suspects are found guilty of demolishing and attempting to steal the moped. The suspects' presence at the scene is not further discussed during the trial.

The above description, taken from our ethnographic notes, demonstrates a noteworthy phenomenon: the use of video footage in court. Today, images, including video, are everywhere, and we are overwhelmingly exposed to images through television, print and digital (including social) media. Everyone is also able to create images: law enforcement use video (surveillance) cameras to observe the streets (as in the example), bystanders use their mobile phone to film or photograph an event and (semi)professionals create animations or infographics to explain complex structures. At the same time, there are also plenty of tools available that allow anyone to (re)create, modify and share images. The digital revolution, as some scholars call it, has an impact on all sorts of (institutional) domains, including law.

In the example given above we see that the video recording is introduced by the public prosecutor who explains her version of what is happening to the judge. The judge views the video recording live during the trial[2] and asks questions about what he sees in the recording. It is also the judge who decides that he has

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1 Cases that are tried at one of the 11 district courts in the Netherlands for which there is a maximum sentence of one year imprisonment are tried by a single judge. More severe or complicated cases are tried by a three-judge panel.

2 The video recording was part of the case file. However, we are unaware of whether the judge and/or lawyer had actually seen the recording before the trial.

'seen and recognised' the suspects. At the end of the trial we learn that part of his decision is based on what he considered to be the truth based on what he saw in the recording. This is in line with Feigenson and Spiesel, who state that 'pictures tend to be intuitively credible, often compelling, and seemingly automatically understood'.[3] According to the same authors, this is then why (moving) pictures can 'persuade more effectively than words alone'.[4] In a society in which the production and storing of (digital) visualisations is only growing, we quickly need to learn more about how people process, understand, interpret and describe visual information, including the field of law. Before we further set out the relevancy and urgency of this research, we will briefly explain the Dutch criminal procedure and how visuals can play a role during the hearing.

Criminal hearings in the Dutch inquisitorial system begin with a suspicion. When the public prosecutor decides there is enough evidence, he or she draws up an indictment. The indictment lists the punishable acts the suspect is charged with and how these acts qualify legally. During the criminal trial, judges decide whether the indictment holds and whether the evidence legally and convincingly proves the suspect's guilt. The suspect's lawyer can refute or diminish the indictment. A judge can only convict a suspect for the charges that are listed in the indictment.

Zooming in on the actual trial stage of the criminal process, Dutch hearings are characterised by a 'debate amongst the actors (the judge, prosecutor and the defence) with an active role for the judge, which shall result in the establishment of the substantive truth by the judge'.[5] The judge has an investigative role and not only listens to the public prosecutor's and defence lawyer's arguments, but also questions the suspects and possibly other participants at trial. Furthermore, the written case file plays an important role in the trial.[6] This file may include written records from the police, expert reports, but also photographs, videos, maps and other pieces of visual evidence. Interestingly, as the court relies on written statements, the file contains *descriptions* of the visual materials. The descriptions are mostly written up in police record format and therefore written by the police. It depends on the type and availability of the visualisation whether it is also physically present in the file. The (descriptions of) visualisations that are part of the case file can be studied beforehand by all parties. Yet, there are also visualisations that are introduced as new evidence and shown during the trial. Furthermore, Roosma and Dubelaar note that judges are free in what (visual) evidence they wish to see and what value they attach to this evidence.[7]

Roosma and Dubelaar[8] also note that, in the Netherlands, it is mostly the public prosecution who adds visual evidence to the criminal procedure, varying from computer reconstructions to surveillance camera video footage to police photographs from the crime scene. It is also the public prosecutor who has the burden of proof and who is lawfully responsible for assembling the case file,[9] including visual evidence. However, the visualisations are often *made* by other parties, such as the police, experts and, increasingly, by lay people. Visuals made by lay people are often not intended for the judicial context (for example lay people's telephone video recordings or photographs of an accident) and even when they are made for this purpose, their quality can differ greatly.[10]

With the increasing production and use of images in society, and a large body of research concerning images from a communications perspective that is in some cases applied to the domain of law, we set out two aims for this paper. We will first provide a theoretical background from the communications discipline regarding visualisations in court. We focus only on visual evidence (i.e., 'demonstrative evidence'),[11] thereby

3 N. Feigenson & C. Spiesel, *Law on display: The digital transformation of legal persuasion and judgment* (2009), p. 10.
4 Ibid.
5 M.F.H. Hirsch Ballin, *Anticipative Criminal Investigation* (2012), p. 40.
6 M. Komter & M. Malsch, 'The Language of Criminal Trials in an Inquisitorial System: The Case of the Netherlands', in L.M. Solan & P.M. Tiersma (eds.), *The Oxford Handbook of Language and Law* (2012).
7 J. Roosma & M.J. Dubelaar, 'Visueel bewijs in het Amerikaanse strafproces', (2011*) Justitiële verkenningen*, 37(7), pp. 77-91.
8 Ibid. for a comparison between the use of visual evidence in the criminal process in the Netherlands and the US; see Feigenson & Spiesel, supra note 3, for an overview of visualisations in the law from an American perspective at that time.
9 G. Vanderveen & J. Roosma, *De plaats delict in beeld. Fotografie in de dagelijkse en gesimuleerde praktijk* (2013).
10 Ibid.
11 R.J. Rychlak & C.L. Rychlak, 'Real and demonstrative evidence Away from trial', (1993) *American Journal of Trial Advocacy*, 17(2), pp. 509-528.

excluding (audio-)visual aids that facilitate remote communication.[12] Secondly, since we know little about how often images are used in court, we will then report on a small-scale study that gives us insight into how often images are used, when, what types of images they are, by whom they are introduced and whether they are physically shown or not. At the end of this paper we will discuss future directions for research focusing on how (Dutch) court participants possibly process, understand, interpret and describe visual information.

2. Theoretical background

Before the invention of the photograph (taken by a camera) in 1816, visuals in court consisted of drawings and maps. Around the 1850s, lawyers brought along photographs to court to illustrate situations, and in the 1870s photographs were used to, for example, prove identities of victims or defendants.[13] Almost immediately the use of photographs raised discussions in the field of law: were photographs 'an unmediated replication of nature' or 'manipulable, partial and potentially misleading'?[14] Researchers in the fields of visual culture studies and photography studies have written extensively and critically on the dangers of using images to prove things.[15] Since then many scholars from the fields of law and criminology have conducted various studies concerning the use of visuals in court. Focusing on photographs as well as the use of video and other images, researchers demonstrated whether visuals can raise emotions and have an effect on guilty verdicts[16] and whether or not visuals should be used for identification purposes.[17]

We believe that in order to grasp the significance of visuals in court, we have to acknowledge that images can be made by all sorts of people with all sorts of purposes and can be seen and processed by all sorts of other people and interpreted in multiple ways. How meaning is assigned to the visual is hence a very complex matter. Drawing from the Synergetic model of communication,[18] we must see each communication interaction within its context: the sender in the interaction is shaped by individual and societal forces embedded in culture and sends a message through a particular medium within a particular context. At the same time the message is received by a receiver whose individual and societal forces embedded in a particular culture shapes how meaning is assigned to the message.[19] In this paper we argue that first, we need research on the use of various images in court, before we can begin to understand the complex meaning-making processes of images in all its varieties in all sorts of contexts.

In order to do so, we will begin this theoretical section with a definition of 'an image' or 'visualisation' and explore the image as medium within the model of communication. Secondly, we will report on what the current literature says about various communicative functions of images in court and demonstrate that we need more research on this topic. Thirdly, we turn to the receivers of the visuals: we elaborate on what effects visuals can have on emotions and how this may affect the meaning that is assigned to visuals. Fourthly, we explain the notion 'visual literacy' – a concept that is crucial in understanding images on the receiver's end.

2.1 Defining the 'image' as a medium

By 'image' we mean any form of visual (re)presentation of objects, persons, events and scenes that conveys a message; we therefore see the image itself as a medium. We also refer to this as 'visuals' or 'visualisations'.

12 A. Wallace et al., 'Judicial engagement and AV links: Judicial perceptions from Australian courts', (2019) *International Journal of the Legal Profession*, 26(1), pp. 51-67.
13 J.L. Mnookin, 'The image of truth. Photographic evidence and the power of analogy', in D. Dufour (ed.), *Images of conviction: the construction of visual evidence* (2015), pp. 9-15.
14 Ibid., pp. 9-10.
15 A. Sekula, *Photography against the grain* (1984); J. Tagg, *The burden of representation* (1988); K. Biber, 'Looking and knowing: Jurors and photographic evidence', (2007) *Reform*, 90, pp. 24-26.
16 D.A. Bright & J. Goodman-Delahunty, 'Gruesome evidence and emotion: Anger, blame, and jury decision-making', (2006) *Law and human behavior*, 30(2), pp. 183-202; L.F. van Dillen & G. Vanderveen, 'Gruwelijke beelden van plaatsen delict: Kijkstrategieën, opgewekte emoties en oordeelsvorming', (2017) *Tijdschrift voor Criminologie*, (59)1-2, pp. 176-193; J.M. Salerno, 'Seeing red: Disgust reactions to gruesome photographs in color (but not black and white) increase convictions', (2017) *Psychology, Public Policy, and Law*, 23(3), pp. 336-350.
17 G. Edmond et al., 'Law's looking glass: Expert identification evidence derived from photographic and video images', (2009*) Current Issues in Criminal Justice*, 20(3), pp. 337-377.
18 J.K. Alberts et al., *Human communication in society* (2012).
19 Ibid.

The types of images that typically appear in court are photographs, maps, graphs, diagrams and dynamic images, such as video footage.[20] In the US, these visual presentations are often a representation of the crime at stake.[21] That is, the prosecutor and the defendant's lawyer present their side of the story by re-enacting the crime verbally and visually. They tell a (counter)story that explains their case and use images to support its truth-value. The defendant can also use visualisations to undermine the prosecution, who has the burden of proof. In this situation visualisations are used to refute presented evidence.

According to Feigenson and Spiesel,[22] images can be of three different types. The first type includes visual representations that are *descriptive* of our perception. Hegarty refers to these images as iconic images.[23] Iconic images are representations of objects that themselves are visual-spatial entities. Straightforward examples of descriptive images are photos and film of objects, actions or events. Descriptive images can however also slightly 'distort' reality, for example in a line drawing. A photograph resembles closer how we would have perceived the actual object or event, whereas a line drawing is a translation of our sight *and* thought. As a result, in these slightly distorted images you will often find some distance between the representation and the actual visual-spatial entity. In street maps, for example, the width of the streets is inaccurate and trees are left out. These two types of descriptive images can have different functions in court. A photograph of a street can be used to indicate the beauty of a tree that should not be removed, whereas a circle on a street map resembling that same tree can be used to show where the tree is precisely located. This shows that descriptive images can be altered or not, depending on the particular task it is to fulfil.

The second type refers to images that are diagrammatic. These are graphic representations that are based on our thought and then translated into a visual representation. Whereas descriptive representations are based on perception, diagrammatic representations are based on cognition.[24] Hegarty refers to these images as relational images.[25] These images represent entities that do not have a spatial referent in reality and therefore are not visible. Examples of diagrammatic images are bar graphs, scatter plots or diagrams, in which visual features like colour, shape and location represent relations between several factors. Such diagrammatic representations are often used in court by scientific experts, who construct a visual to (help) explain facts and opinions.

The third type that Feigenson and Spiesel dissect concerns notational images.[26] These include words or mathematical expressions. Notational images very often form a hybrid visualisation with descriptive and/or diagrammatic images. An example of a combination of the three types of images is a functional magnetic resonance imaging (fMRI) picture. An fMRI scan is a scan of the brain during which the patient performs several tasks, mostly based on cognitive control and attention. The result of the fMRI scan is an fMRI picture showing the slice of a brain in black and white, and coloured areas to indicate areas where the brain was significantly more or less active in the test condition than in the baseline condition. The picture also includes words such as the area in which the active area was found, for example 'prefrontal cortex', or numbers indicating the level of significance. In Feigenson and Spiesel's terminology, the slice of the brain is descriptive, the coloured areas are diagrammatic and words such as 'prefrontal cortex' are notational.

A second interesting distinction between images is whether the image is static or dynamic. Static refers to fixed or still images and dynamic refers to moving images such as film or animation. Research shows that each type has its own cognitive advantages, particularly in learning environments.[27] For example,

20 S.M. Marder, 'The court and the visual: Images and artifacts in U.S. supreme court opinions', (2013) *Chicago-Kent Law Review*, 88(2), pp. 331-364.
21 D. Tait, 'Rethinking the role of the image in justice: Visual evidence and science in the trial process', (2007) *Law, probability and risk*, 6, pp. 311-318.
22 Feigenson & Spiesel, supra note 3.
23 M. Hegarty, 'The cognitive science of visual-spatial displays: Implications for design', (2011) *Topics in cognitive science*, 3(3), pp. 446-474.
24 Feigenson & Spiesel, supra note 3.
25 Hegarty, supra note 23.
26 Feigenson and Spiesel, supra note 3.
27 R.E. Mayer, 'Cognitive theory of multimedia learning', in R.E. Mayer (ed.), *Cambridge handbook of multimedia learning (*2005), pp. 31-48; M. Hegarty et al., 'When Static Media Promote Active Learning: Annotated Illustrations Versus Narrated Animations in Multimedia Instruction', (2005) *Journal of experimental psychology: applied*, 11(4), pp. 256-265.

people can process static images at their own pace and in their own order. This enables them to extract the most relevant elements of the static image and to retain these elements in their memory. The retained information can subsequently be used in other situations. For dynamic images, people cannot control the pace or order of the presentation themselves. However, as dynamic images are assumed to be more realistic, interesting, entertaining and motivating, less cognitive effort might be needed to study the image in the first place.

What the different types of images and their presumed (dis)advantages mean for the use of images in court is until now unclear. At this stage it is even unclear what types of images are actually present in the case file and the hearing. In Section 3, we will report on a study that provides a first insight into this question.

2.2 Images and communicative functions of the sender

Images are always created by someone. An important distinction to make however, is that the maker and sender can be (and often are) two different people. In this section we focus on the sender of the images, who uses the image with a particular communicative function in mind. From a communications perspective, images can have multiple communicative functions. Levin has proposed five functions of images that are presented alongside text: they can be used (1) as decoration, making a document look more attractive, (2) to help the reader create a mental representation of an event, person, place or thing, (3) to help the reader to remember the most important information in a text, (4) to help the reader organise information and (5) to explain something to the reader, such as an instruction.[28] Although the text in court is to a large extent spoken, one can easily think of visuals in court with the communicative functions 2, 3, and 4. Yet very little *empirical* research has been conducted on the communicative functions of images in court.

Some researchers though did make suggestions about the functions that visual material can *potentially* have in court. Tait reports on a dialogue that occurred between various participants at the conference on graphic and visual representations of evidence and inference in legal settings held in New York in 2006.[29] He states that in the legal process two sorts of images play a major role: images that are used as an instrument of logic and images that are used as a rhetorical device. Although seemingly dichotomous, the two types of images can overlap in particular contexts and should not be perceived as mutually exclusive. Think for example of an aerial photograph in a murder case, on which a murder weapon, a couple of houses and a victim is shown. The photograph shows a relationship between entities and thereby informs on the situation the murder occurred in. Yet the presentational context of the courtroom also makes the image a tool of persuasion. Linguistic descriptions alongside the presentation of the photograph strengthen this persuasive function. Moreover, Feigenson[30] noted that even gruesome crime scene or autopsy photographs, which have been shown experimentally to affect mock jurors' judgments through the emotions they arouse,[31] also convey reliable, probative information about the facts of the case. If this was not the case, the judge should not be admitting them to the hearing in the first place.

Further, Roosma and Dubelaar specifically looked at the Dutch situation and also differentiate between two different communicative functions that visuals can have.[32] First, just like Tait suggests, Roosma and Dubelaar write that visual material in the criminal process can be used to persuade the judge. Second, the authors suggest that visual material can be used to present, visualise, categorise and contextualise evidence. They put the emphasis on the presentation of evidence - which is closely related to the logic function that Tait describes. Roosma and Dubelaar refer to earlier work by Dubelaar and Vanderveen who also distinguished

28 J.R. Levin, 'On the functions of pictures in prose', in L.M. Pirozzolo & M.C. Wittrock (eds.), *Neuropsychological and cognitive processes in reading* (1981).
29 Tait, supra note 21.
30 Personal communication with the authors.
31 Bright & Goodman-Delahunty, supra note 16; K.S. Douglas et al., 'The Impact of Graphic Photographic Evidence on Mock Jurors' Decisions in a Murder Trial: Probative or Prejudicial?' (1997) *Law and Human Behavior*, 21(5), pp. 485-501. See Section 2.4 for more details of the studies.
32 Roosma and Dubelaar, supra note 7.

between these two categories.[33] The authors mention that we do not have any information on how often these communicative functions occur, neither do they define what these functions actually mean within the courtroom context.

As we know little about the communicative functions as intended by the senders within court, we suggest that more research is needed to understand this from a sender perspective. There is, however, research to be found on the communicative and cognitive functions various visual types may have from a receiver perspective, which will be explored in the next section.

2.3 Receiving the images: vividness and emotion

As described earlier, in the Netherlands the court relies on written statements. This also means that images are described on paper and thus written up as a statement. For example, police officers write up what they saw when looking at a shop's surveillance camera, or describe the photograph made of the victim. Sometimes, the original images are included in the case file, sometimes judges rely solely on the written description of the image. Whereas there may be all sorts of practical reasons for this, whether the original image was actually seen or not may lead to different interpretations of that same image.

Most researchers who consider images as rhetorical devices exemplify gruesome photographs, graphic animations and displays that report scientific findings.[34] The effects that these kinds of images have on people are often connected to experienced vividness and emotion.[35] According to Bell and Loftus, vividness is related to the levels of detail of the presented (in their case) eyewitness testimonies.[36] More detail leads to the experience of vividness, and we are likely to direct more attention to vivid information than pallid information. This increased attention results in a longer and stronger storage in our memory, a good foundation for the rhetorical device to do its work and persuade the viewer. Images are in turn more detailed and vivid than descriptions of those same images and are therefore presumed to be better rhetorical devices than descriptions. Moreover, unlike words, which are constructed by the speaker or writer and are therefore understood as a translation of reality into words, images tend to come across as a representation of the external world without human mediation.[37] As a result of this *naive realism*, images are almost never questioned for their truth-value.

Images are also assumed to evoke more intense emotions than descriptions of images. IJzermans describes the function of emotions as bridging the gap between the intuitive and deliberate reasoning whilst decision-making.[38] That is, emotions function as spotlights when selecting and processing information. In this context, there seems to be a strong influence of the feeling of (un)certainty that the emotion induces. That is, some emotions are associated with a greater sense of certainty than others; anger, disgust and happiness are emotions that express a feeling of certainty, whereas hope, anxiety and amazement result in a feeling of uncertainty.[39] The greater the sense of certainty, the less inclined people are to process information systematically and the more they are susceptible to heuristic cues. The greater the sense of uncertainty, the more people will try to accomplish the feeling of certainty, by processing information more thoroughly. As such, feelings of uncertainty experienced by a judge can be beneficial for his or her

33 M.J. Dubelaar & G.N.G. Vanderveen, 'Beeld en geluid in het strafproces; implicaties van de opkomst van (audio)visuele technieken en materialen voor communicatie en besluitvorming in de strafrechtspraktijk', (2009) *Nederlands Juristenblad*, 30(84), pp. 1954-1960. Roosma & Dubelaar, supra note 7, furthermore refer to a third category where they describe visual material that is used for communicative purposes between the parties, for example, a live videoconference, so that an expert or witness who is not physically present can be heard in the courtroom.

34 Tait, supra note 21.

35 R.J. Nemeth, 'The impact of gruesome evidence on mock juror decision making: The role of evidence characteristics and emotional response', Unpublished doctoral dissertation, Baton Rouge: Louisiana State University, (2002).

36 B.E. Bell & E.F. Loftus, 'Vivid persuasion in the courtroom', (1985) *Journal of Personality Assessment*, 49, pp. 659-664; B.E. Bell & E.F. Loftus, 'Degree of detail of eyewitness testimony and mock juror judgments', (1988) *Journal of Applied Social Psychology*, 18(14), pp. 1171-1192.

37 R.K. Sherwin et al., 'Law in the digital age: How visual communication technologies are transforming the practice, theory, and teaching of law', (2006) *Boston University Journal of Science and Technology Law*, 12, pp. 227-270.

38 M.G. IJzermans, 'De rol van rechterlijke emoties bij het oordelen', (2012) *Rechtstreeks*, 3, pp. 15-40.

39 L.Z. Tiedens & S. Linton, 'Judgment under emotional certainty and uncertainty: The effects of specific emotions on information processing', (2001) *Journal of personality and social psychology*, 81, pp. 973-988.

judgment. Judges' emotions in reaction to images can thus have a positive and a negative effect on the decision process.

Different types of images induce these different kinds of emotions amongst the receivers of the images. Bright and Goodman-Delahunty found that mock jurors who saw (gruesome) photographs reported experiencing more intense emotional responses as compared to those who saw no photographs.[40] The photographs mainly induced feelings of anger. Mock jurors that were part of the Douglas et al. study read a detailed trial transcript of a murder trial, with either colour or black and white photographs or no photographs.[41] As compared to the control condition in which no photographs were shown, participants reported more feelings of emotional distress in response to viewing the photographs. Strikingly, the proportion of subsequent guilty verdicts was twice as large as compared to the control condition. These results cannot be translated to the Dutch situation as experienced and highly trained judges interpret these images as opposed to lay people on a jury. We do not know of any empirical research that has carried out such studies with trained judges.

Given Sections 2.2 and 2.3 above, we need to learn more about the role and effects of visualisations in court both from a sender and receiver perspective. What types of visuals are used, with what purpose and how do these visualisations possibly influence the perception and cognition of the participants present during the hearing, especially the judge when dealing with an inquisitorial system?

2.4 Receiving the images: visual literacy

One aspect that can have a strong influence on how images are received is one's level of visual literacy. Visual literacy is an indicator of how well we are able to 'read' images and understand them. According to Bamford, being visually literate is a combination of visual syntax and semantics.[42] Visual syntax refers to the pictorial structure and organisation. It concerns the ability to perceive perceptual features such as scale, motion, perspective, background/foreground and draw conclusions from that in terms of camera placement, editing and point of view. Visual semantics refers to the way that we give meaning to the visualisation. When we give meaning to the image we think about who made it, with what purpose it was made, when it was made, whether it was manipulated, what is says about an event, etc. So, visual literacy is a set of skills, not only to interpret the content of visual images, but also to look critically at its purpose, audience and ownership. It is evident that these skills are vital for the participants of the courtroom too. That is, it is important that visual evidence is properly interpreted and that information on the (spatial, temporal, societal, cultural) context of the image is taken into account when meaning is assigned to the image.

Work by Biber on identification of suspects through photographs shows the discrepancy between our perceived visual literacy and our actual visual literacy.[43] That is, our capacity to interpret photos is dependent on photographs that we saw previously. Hence we feel confident; we have seen so many different photographs before. Yet, when we are shown a photograph and asked to identify a suspect based on that photograph, we suddenly experience a strong feeling of doubt. What is it that we see? Are we drawing the right conclusions from the visual? This uncertainty can only be diminished if participants of the court receive training on this type of professional visual literacy.

Next to acquiring visual literacy, participants of the court should also be aware of 'professional vision,' which refers to the way people see and understand events differently based on their professional and cultural background (and consecutive goals).[44] The Rodney King case very clearly shows us that lawyers from different sides can each structure the same piece of visual information (in this case, video footage) according to their own agendas. Goodwin's micro-analysis of both the talk and the image shows how 'talk and visual representation mutually amplify each other'.[45] As such, the talk around the visual makes it even harder to

40 Bright and Goodman-Delahunty, supra note 16.
41 K.S. Douglas et al., 'The Impact of Graphic Photographic Evidence on Mock Jurors' Decisions in a Murder Trial: Probative or Prejudicial?' (1997) *Law and Human Behavior*, 21(5), pp. 485-501.
42 A. Bamford, *The Visual Literacy White Paper* (2003).
43 Biber, supra note 15.
44 C. Goodwin, 'Professional vision', (1994) *American anthropologist*, 96(3), pp. 606-633.
45 Ibid., p. 623.

draw objective conclusions from the visualisation for court participants. Court participants therefore need to be aware of how professional vision comes about and what consequences this may have.

So, with the expected increased amount of images entering the court system and a low professional visual literacy, it is becoming important that participants in the courtroom are being trained to improve their visual literacy. Whilst the majority of law studies (at least in the US and in the Netherlands) strongly focus on written and verbal skills, there might be a need to include visual literacy skills in the near future.

3. Small-scale ethnography and corpus study

In Section 2 we reported on various studies, some of which have been carried out within the legal domain (often in the US), that show that visualisations can take different forms, serve various communicative functions and have different cognitive effects, each with its own impact on various participants. Before we can further study the effects of visuals in court from a communications perspective, we need more information about what types of images are used, by whom and with what purpose. Only then can we begin to uncover what the effects of the choice of the medium are on its receivers. We therefore set up a small-scale study in the Netherland to find out:

1. What types of visualisations are used in the Dutch court for minor felonies?
2. By whom (public prosecutor or defending party) and how (shown or described) are the visualisations introduced during the court hearing?
3. What relations exist between the factors studied in 1 and 2?
   a. Is there a relation between types of visualisations and whether they are shown or described in court?
   b. Is there a relation between types of visualisations and by whom they are introduced in court?

3.1 Method

In this study we combined an ethnographic approach with a systematic observation. During an initial one-week ethnography study, an observation scheme (see Section 3.2) was constructed. During this ethnography phase, six students and the two authors attended eight hearings, in which we specifically focused on the use of visuals. The ethnographic observations resulted in several criteria to determine the use of visuals. The criteria were tested by the researchers and slightly adapted so that systematic coding could be optimised. During a follow-up two-week period in the spring of 2016, the eight researchers (six students and the authors) observed a total of 85 different criminal law hearings at the Utrecht Court in the Netherlands. The hearings mainly concerned minor felonies. The 85 hearings were coded by hand based on the observation scheme. The coded observations were logged in Excel and SPSS. We performed descriptive statistics and chi-square analyses[46] to analyse the distribution of several characteristics over the observed images in the court hearings.

3.2 Operationalisation

The observation scheme requested information on the date, time and the participants present at the hearing. For each image that was presented during the hearing several characteristics were coded. First, it was coded whether the image was literally present or whether one of the participants verbally described an image that was present in the case file but not presented itself at the trial. Second, it was coded which participant introduced the image. Third, the image was characterised as a photo, photo sequence (for example, stills of a video), video, animation, illustration/line drawing, statistical overview or map. Fourth, the types of images were categorised as descriptive, diagrammatic or notational. Fifth, the types of images were categorised

46 A Pearson's chi-square test can be used to see whether there is a relationship between two categorical variables. It compares the frequencies you observe in certain categories to the frequencies you might expect to find in those categories by chance.

as either static or dynamic. Static images included photos, photo sequences, illustrations/line drawings, statistical overviews and maps, whereas videos and animations were categorised as dynamic images.

3.3 Results

Our observations, or collection of systematically observed hearings (henceforth: corpus) consists of 85 different criminal law hearings observed at the Utrecht Court in the Netherlands: 80 hearings at the court for minor felonies (one judge) and five hearings at the court for severe felonies (three judges). The mean duration of the hearings in court for minor felonies was 31.5 minutes (SD = 20.3) and for the hearings in the court for severe felonies 99 minutes (SD = 29.67). Table 1 shows the variation of the number of images discussed per hearing.

Table 1 Number of images discussed per hearing

Number of images	Occurrences	(%, % if images present)
0	44	(51.8%)
1	21	(24.7%, 51.2%)
2	12	(14.1%, 29.3%)
3	6	(7.0%, 14.6%)
4	1	(1.2%, 2.4%)
8	1	(1.2%, 2.4%)

In 48.2% (n = 41) of the hearings, so about half of the cases, images (or descriptions of images) were used, as compared to 51.8% (n = 44) of the hearings in which no images were used. In those 41 hearings in which a visual was used, a total of 75 images was referred to. In most hearings, only one (51.2%) or two (29.3%) images were presented and discussed.

Furthermore, our data shows that 72% (n = 54) of the images was actually present in the case file and in the courtroom and shown to the participants, as compared to 28% (n = 21) of the images that was only described by one of the participants. These images may have been present in the case file, but not shown to the participants during the hearing. Our corpus contains for example a description of a photograph showing a battered door after a fight between a suspect and a victim, and a description of a video capturing a car theft.

The majority of the (described or presented) images in our corpus were either photographs or videos. The corpus did not contain animations, illustrations/line drawings or statistical overviews. Hence, all images were categorised as descriptive, rather than diagrammatic. Moreover, about 23% (n = 17) of the images were dynamic (i.e., video) and the remaining 77% (n = 58) consisted of static images (i.e., photographs, photo sequences and maps). Table 2 shows an overview of the types of images found.

Table 2 Types of images

Type of image	Occurrences (%)
Photograph	54 (72%)
Photo sequence	3 (4%)
Video	17 (22.7%)
Map	1 (1.3%)

Over half of the images was produced by law enforcement officials (such as police or local watchmen employed by the municipality). These images were for example photographs of weapons or tools found at the crime scene, photographs of the scene itself (e.g., (suspected) marks of hemp growing pots) and surveillance camera footage of cameras placed at strategic spots. The other images were produced by suspects, victims or, in one case, a witness, see Table 3. Images that for example were taken by victims concerned in five out of seven cases photos of their injuries resulting from abuse.

Table 3 Image makers

Image maker	Occurrences (%)
Law enforcement	45 (60%)
Suspect	9 (12%)
Victim	7 (9.3%)
Witnesses	1 (2.7%)
Unclear	12 (16%)

A chi-square analysis shows that there is a significant relation between the type of image and whether the image was shown or described in court, $\chi(3) = 36.933$, $p = .000$. Fisher's exact test[47] for small sample sizes also shows a significant effect ($p = .000$). Standardised residuals show that this effect was caused by a higher number of described videos than was expected (n = 14, std. res. = 4.2), a lower number of physically present videos (n = 3, std. res. = –2.6) and a lower number of described photographs (n = 5, std. res. = –2.6), see italics in Table 4. So, during the hearing, videos were often absent and described by participants, whereas photographs were presented. An example of a described video in our corpus concerns footage of a surveillance camera in a supermarket. The public prosecutor describes the video as showing that the suspect is putting several articles in his bag – rather than a shopping basket or cart – and is therefore assumed to be shoplifting.

Table 4 The relation between the type of image and presence in court

	Type of image				
Presence	**Photo**	**Photo sequence**	**Video**	**Map**	**Total**
Physically	49 (65.3%)	2 (2.7%)	*3 (4%)*	0 (0%)	54 (72%)
Description	*5 (6.7%)*	1 (1.3%)	*14 (18.7%)*	1 (1.3%)	21 (28%)
	54 (72%)	3 (4%)	17 (22.7%)	1 (1.3%)	75 (100%)

Almost all images (90.7%, n = 68) were introduced during the hearing by the public prosecutor. Only 9.3% (n = 7) of the images were delivered by the defending party. A chi-square analysis shows that there is a significant relation between the type of image and whether the image was introduced by the public prosecutor or the defending party, $\chi(3) = 10.263$, $p = .016$. However, Fisher's exact test for small sample sizes shows no effect ($p = .149$). We need larger sample sizes to investigate this relationship.

4. Conclusion

The results presented above provide insight into how often images are used in a Dutch court for (mainly) minor felonies, what types of image are used, how they were presented, who made the images and by whom they are introduced during the hearing.

In about half of the observed hearings images were used. Concerning the types of visualisations that were used (Q1), our analysis shows that mainly photographs (and small number of photo sequences) and videos were employed. As such, the observed images in the present corpus are exclusively descriptive. The absence of diagrammatic images might be explained by the type of court hearings that was attended. First, the hearings concerned cases of criminal law. Other law areas, such as civil cases, might benefit to a larger extent from diagrammatic images. Second, the majority of the attended cases appeared for the court for minor felonies. Minor felonies may less frequently require the presentation of diagrammatic images, for example, visualisations designed by scientific experts to explain relations between facts. Furthermore,

47 A chi-square statistic that is accurate when sample sizes are small.

about three quarters of the images was static, as compared to one quarter of dynamic images. Although dynamic images are playing an ever-increasing role in today's society, we surprisingly see that video is not (yet) as popular in court as photographs.

When exploring the relation between the types of visualisations and whether they are shown or described in court (Q2 and Q3a), we found that videos were very often implicitly referred to rather than presented to the participants of the hearing. The majority of the photos, on the other hand, were actually shown during the hearing. This finding might also be explained by the fact that most hearings appeared for the court for minor felonies. In this type of court, multiple hearings are combined in a single morning or afternoon session and are characterised by a quick progression of cases. The results showed that the average session lasted about half an hour. In this short time frame, the public prosecutor might find the presentation of videos to take up too much time. Technical possibilities in the courtroom, as well as balancing time investment and seriousness of the case could be reasons why videos are presented or not. Most images we came across were made by law enforcement. However, images from suspects and victims were also introduced and shown. There was only one case in which a witness had supplied an image.

Regarding the parties that introduced the visualisations (Q2), we found that the images were mostly introduced by the public prosecutor. This finding reflects the fact that the public prosecutor is lawfully responsible for assembling the case file[48] and is therefore in charge of the selection and introduction of any visual material present in the case file. Due to the small sample size, our analysis did not show a strong enough relation between visualisation type and introducing party, to draw conclusions from (Q3b).

5. Discussion

Now that we know that visual materials are used quite regularly in Dutch courts, either explicitly shown during trial (see the example in the introduction of this paper) or implicitly referred to by the judge, prosecutor or lawyer, we need to know more about the effects that visualisations have on the criminal procedure. Earlier reports from the Netherlands suggest that until now there has been very little research on this topic.[49] This is where we believe future research, in the Netherlands and elsewhere, needs to be headed. Below we describe three possible alleys for future research.

1. As the descriptions of the visualisations in the case file are mostly made by the police, we are interested to see how these descriptions are constructed. We propose to investigate whether the type of visualisation (i.e. static vs dynamic) affects the descriptions. Furthermore, we want to know if, and if so, how, the level of visual literacy of the describer resonates in the description. Apart from these experimental studies, we need to get insight into the training that policemen and women receive.
2. The ways in which meaning is assigned to a visualisation can vary greatly. Building on Goodwin's professional vision,[50] we suggest that meaning can be affected by (1) having read the description and/or seen the image beforehand, (2) the way the participants in the courtroom introduce and present their interpretation of the visual, and/or (3) the courtroom conversation around the visualisation. We are therefore interested in analysing the actual spoken communication between the participants of the hearing when visualisations are introduced and talked about.
3. Although various studies have been conducted in the US on how visual materials can influence (mock) jury members, there have been very few experiments on how visual evidence can influence judges. In the Dutch inquisitorial law system, where judges decide whether a suspect is guilty or not and what type of punishment is given, we need to understand how judges refer to, use and process visual evidence. Therefore, we need to understand more about the cognitive effects of these visual materials on the participants in this specific courtroom setting.

48 Vanderveen & Roosma, supra note 9.
49 Ibid.; P.J. Van den Hoven, 'Beeldgebruik in de rechtszaal. Van "kijk zelf maar" naar "laat maar zien"', (2012) *Nederlands Juristenblad*, 87(6), pp. 383-387.
50 Goodwin, supra note 44.

How visualisations are presented and how the prosecutor or judge select and value visual evidence is barely regulated by law in the Netherlands.[51] Dutch researchers have suggested that policy must focus on how visual evidence is created, for example, by improving police training of crime scene photography and the process of describing visualisations.[52] However, with the increasing use of images created by the public (i.e., cell phone video recordings), surveillance cameras and professional image makers, we believe that policy should also focus on visual literacy of the participants in court. Moreover, new forms of technology, resulting in for example 3D scans, virtual reality experiences and satellite surveillance images,[53] will only make visualisations more complex and therefore more difficult to understand, evaluate and judge. American researchers have already pleaded for expanding teaching about visual literacy to law students.[54] The present paper is a first step to explore this important topic in the Netherlands and suggests areas for future (interdisciplinary) research.

51 Roosma & Dubelaar, supra note 7.
52 Ibid.; Vanderveen & Roosma, supra note 9.
53 D. Dufour, *Images of conviction: The construction of visual evidence* (2015), p. 231.
54 Sherwin et al., supra note 37.