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Perpetrators in multimodal media discourse: a case study of personalization in images from *The Telegraph*

Svitlana Shurma ¹ 

The article deals with the visual and linguistic representation of alleged perpetrators through personalization in news reporting from *The Telegraph's* online media platform. The analysis shows how visual message, along with verbal labelling in the text, represent different groups of alleged perpetrators as more or less 'dangerous' in news reports. Agency is analyzed through a focus on the lens range and its influence on perceived social distance, the angle of the shot and its role in the understanding of social relations, as well as the direction of an alleged perpetrator's gaze in images as a way of social interaction with the viewer. The photos of alleged perpetrators appear in *The Telegraph* with the aim of informing the public about the danger these individuals pose, as well as legitimizing the actions of law enforcement institutions. It appears that verbal and visual identification of these individuals is done with the intention of 'excluding' the most dangerous social actors, such as 'murderers', from ingroups.

¹Tomas Bata University in Zlín, Zlín, Czech Republic. email: shurma@utb.cz

Introduction

The relation between the visual and verbal in news media reporting is usually defined by framing. It is viewed as a key “multimodal principle” (Kress and van Leeuwen 2001, 3), or a set of “organizing principles that are socially shared and persistent over time, that work symbolically to meaningfully structure the social world” (Reese 2001, 11).

Framing is a term used in social sciences and humanities with some variations in meaning. In media discourse, framing is understood as a technique that is used by media to enhance meaning aspects by making certain elements of discourse more salient than others (Entman 1993, 52; Kress and van Leeuwen 2001, 2; Maalej 2019, 37). In a way, such perspectivization determines the “power of communicating text” (Entman 1993, 51).

Entman (1993, 53) identified the functions of frames: “selection and highlighting, and use of the highlighted element to construct an argument about problems and their causation, evaluation, and/or solution”. For example, the mother of a terminally ill child, committing an act of euthanasia, may be presented to readers as a killer or a savior through verbal and visual supplement. At the same time, the way readers’ personal beliefs and feelings may be affected by this presentation depends on the schemata already existing in their cognitive systems (Entman 1993, 53; Scheufele 1999): a Christian might support the mother’s presentation as a murderer, while a more liberal reader or someone facing a similar family problem might feel a need to disagree.

In media, the framing of social actors is often connected with the valence encoded in the message (D’Angelo 2017, 1). Standards of reporting usually rely on conventions that influence the framing process (D’Angelo 2017, 2). For example, in shaping their news, *The Daily Telegraph*¹ depends on the Independent Press Standards², which safeguard the ways that certain sensitive issues of public domain are to be reported. Thus, through framing mass media can potentially set the patterns of interpretation associated with specific social actors (van Leeuwen 2005b, 74). The media portrayal/framing of various social actors has been addressed in a number of scholarly publications (see e.g., Johnston and Noakes 2005; Norris 2011; Haynes and Hennig 2011; *Journal of Perpetrator Research*, etc.).

According to Machin and Mayr (2013, 77), “in any language there exists no neutral way to represent a person.” It is impossible to avoid linguistic evaluation (*sensu* Nevala 2019, 22) along with visual one when it comes to reporting about such sensitive public issues as violent acts. Apart from the two main parties involved in violence, perpetrators and victims, often law enforcement or government representatives, witnesses and friends/family are given voice to in media discourse. If “moral evaluations can be connoted visually or represented by visual symbols” (van Leeuwen 2008a, 120), then discourse, possibly shaped by the ideologies, through its ability to “embody affect” (van Dijk 2000, 21), might, or rather would, potentially tend to connect the representation of social actors with emotional and evaluative appeal. Yet, though it may seem simple to label the perpetrator, for example, as “evil” or “bad”, and the victim as “good”, the reality is not that simple. For example, the public would most probably support a perpetrator who committed homicide in the act of self-defense. Therefore, to reflect an attitude, the media ascribes social agency by using specific linguistic and visual structures (Kress and van Leeuwen 2006, 76–78).

The linguistic representation of social actors described in detail by Theo van Leeuwen (1996; 2008b) has become an analytical tool for many CDA studies. This scholar has focused on a “*sociosemantic* inventory of the ways in which social actors can be represented” (van Leeuwen 1996, 32). Machin and Mayr (2013,

Ch. 4) applied the approach to multimodal discourse, focusing on those aspects of the model that can be applied to the analysis of visual data.

Stemming from the linguistic data, van Leeuwen (2008b) identifies two major linguistic strategies in the representation of social actors in media discourse: inclusion and exclusion. “Representations include or exclude social actors to suit their interests and purposes in relation to the readers for whom they are intended” (van Leeuwen 2008b, 274). Linguistically, social actors which are chosen to be included in the texts, could be represented through personalization or impersonalization (van Leeuwen, 2008b, 292–294; Machin and Mayr 2013, 79–80). The former refers to verbal representation of social actors as human beings (e.g., through nomination, functionalization, etc.), while the latter means using linguistic expressions to refer to social actors by way of, for example, abstraction or objectivation (van Leeuwen 2008b, 286, 288, 292). When it comes to visual representation, the choice of visual supplements also depends on the “ideological requirements” (Machin and Mayr 2013, 102) the newspaper pursues. Unlike the linguistic choices, visual supplements are often more limited in their semiotic potential due to certain restrictions such as space and text arrangement, among others. Therefore, the inclusion of social actors via the choices of visual supplements becomes often more meaningful than their exclusion, or absence of visual representation. “[S]election is an inevitable part of every act of making a photographic image and displaying it to the public. Hence its special relevance for the process of visual framing” (Messaris and Abraham 2010, 218). In fact, the inclusion of images may compensate for the lack of certain information in the verbal message, enhance emotional impact, support the ideology and message, and so on. From the perspective of framing, inclusion is also of greater importance than exclusion itself since it becomes a part of a cognitive solution (Gillespie et al. 2013, 227), an analytical picture (Kress and van Leeuwen 2006, 89) offered to the reader through elements that become salient. Present case study focuses solely on the articles where the images of the alleged perpetrators were included to accompany the text of the articles. With regard to visual imagery, the term ‘personalization’ is used herein to refer to visual representations of social actors as identifiable humans through their culturally recognized role or verbal personalization in the article text. The visual structures underlying the framing of personalized social actors in images include social distance (via the length of camera shot), social relation (angle of camera) and social interaction (‘offer’ and ‘demand’ images depending on the direction of the gaze of the perpetrator) with the viewer (van Leeuwen, 2008a, 138–141). The shot range allows the interpreter to talk about the closeness of the social actor to the viewer, focusing on the so-called “symbolic distance” (van Leeuwen 2008a, 138). The vertical angle of the camera reflects the involvement or detachment with the represented perpetrator, while the vertical angle could be used to represent their position of “symbolic power” (van Leeuwen 2008a, 139). The direction of the perpetrator’s gaze towards or away from the viewer grants the distinction of ‘offer’ images, which position the public as “voyeurs”, and ‘demand’, which make the viewer look directly into the eyes of the social actor, address the viewer with the aim of further interpretation (van Leeuwen 2008a, 141).

What should be noted, too, is that linguistic/visual inclusion and exclusion should not be confused with ingroup inclusion and exclusion (e.g., Pickett & Brewer 2004; Nesdale 2011). While the former are the elements of text manipulation via framing discussed above, the latter concerns social group preferences and biases that influence individual’s membership or exclusion from such social groups.

This paper aims at outlining the strategies of framing perpetrators, as a group of social actors, visually, via verbal mediation, through the lens of van Leeuwen's idea of 'personalization' applied to verbal identification and visual representation in news reports. The cases study of *The Telegraph* alleged perpetrator representation addresses the question of how the "discourse becomes a tool for claims and imputations of social identity" (Jones and Norris 2005, 4) of an individual labelled in the discourse as a perpetrator. The study attempts to bring together two approaches: (critical) discourse-analytical approach (e.g., Kress and van Leeuwen 2001; van Leeuwen 2008a; Jones 2012; Tannen et al. 2015) and social semiotic one (e.g., van Leeuwen 2005a; Kress and van Leeuwen 2006; Caple 2006; Kress 2010). A more focused framework of Multimodal Critical Discourse Analysis (MCDA) (Chouliaraki 2006; Machin and Mayr 2013; Djonov and Zhao 2016) allows analysis of both the visual and verbal message from the perspective of power imbalance and ideology. It also helps to trace how the construal of the alleged perpetrator's representation shifts along the 'safety' \leftrightarrow 'danger' axis. Agency, which is an important focus of MCDA, is analyzed from two perspectives: (1) how selected social actors are visually (and verbally) represented, as well as (2) how engagement with the viewer happens. Though MCDA has been criticized for its subjectivity (see, e.g., Wodak 1999; Wooffitt 2005), the usage of methodology borrowed from other disciplines, such as Social Semiotics, could help to redress the limitation. This suggested merging of methodologies could help to uncover implicit attitudes and perceptions in communication practices that involve representations of social actors. The case study thus could be of interest to reporters as well as discourse studies scholars and students.

Materials and methods

The Telegraph is the online counterpart to the British 'right-leaning broadsheet' *The Daily Telegraph*. The digital version has an accessible-upon-subscription archive of articles³. *The Telegraph* is often characterized as a "populist," "pro-Christian" newspaper focusing generally on soft news and human-interest stories (Baker et al. 2013, 7, 9–10, 23), which could potentially influence the representation of perpetrators based on the type of crime they are accused of. The chosen images accompanying news stories dealing with different forms of violence were collected from the News Section of *The Telegraph* online archive as of January 2010. The definition of violence by the World Health Organization is applied to the material: "The intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation" (WHO 2002, 4). Thematically, the chosen articles deal with the following forms of violence: terrorism and terrorist threats, violent attacks including rape, domestic abuse, alleged preparation for violent acts, and murder.

The corpus was created of the articles accompanied with the photographs that portrayed alleged perpetrators as indicated by linguistic cues, i.e. in captions or the news stories themselves. These photos will be generally referred to as 'images' because some of them were digitally manipulated before publication. For example, the Reuters photograph of Osama bin Laden in *The Telegraph* article "Osama bin Laden tape: working an 'indicator' of attack"⁴ appeared on other web resources flipped horizontally (see aawsat.com or abc.net.au). The corpus also includes courtroom sketches, as in the article "Ellington attacks: battle rages over 'Broken Britain'" of 22 January 2010. A comparative analysis of the representations of other types of social actors will become the focus of further studies.

Strategies for the framing of alleged perpetrators were analyzed through the application of three dimensions salient for presenting them in the material collected. 'Offer' and 'demand' images allow to interpret social interaction between the alleged perpetrator and the viewer. Within these categories, social distance (the range at which people are shown) and social relation of the participants of discourse (camera angle) (van Leeuwen 2008a, 138–141) are further discussed.

The total number of images analyzed was 95. The images selected appeared below a headline and standfirst, and featured a caption providing context for the image. In articles with more than one image, we focused only on the one immediately visible to the reader below the headline or standfirst. The articles were accessed⁵ and the data collected from June 2019 to February 2020, prior to the changes in *The Telegraph's* subscription policy.

The study builds on insights provided by MCDA (Chouliaraki 2006; Machin and Mayr 2013; Ledin and Machin 2018), a model which in turn relies on Social Semiotics methodology (van Leeuwen 2005a, 2008a, b; Kress and van Leeuwen 2001, 2006). In MCDA, "we explore the way that individual elements in images, such as object and settings are able to signify discourse in ways that might not be obvious at an initial viewing" (Machin and Mayr 2013, 31). The present analysis seeks to examine how *The Telegraph* frames the ways that sensemaking takes place via personalization. Framing consists of ideological and culturally-driven choices that result in the selection and composition of images that accompany violence-related articles, and which affect socially-constructed meaning. In line with D'Angelo (2017, 5), we follow a three-step frame analysis to identify stereotypical framing features with regard to reporting on violence: (1) identifying linguistic labels and visual presentation features; (2) examining discourse patterns and image attributes; and (3) providing a content analysis of narrative conventions.

Results: personalization in *The Telegraph* images

Below specific elements of the visual representation of perpetrators in images are examined, with the focus on the aspects of social distance and relation via social interaction. The corpus shows that the direction of the alleged perpetrators' gaze is the most salient feature in the images accompanying the articles on violence in *The Telegraph*, and all 95 images can be divided into 'offer' (42 images) and 'demand' (53 images). Closer inspection demonstrates that within each of the groups the range of the shot (distance) is the next most salient feature which influences the interpretation of social distance to the represented social actor. And finally, the angle of viewing the alleged perpetrators in 'offer' and 'demand' images guides the interpretation of the intended symbolic social relations with the social actor(s). The results are summarized in Table 1:

Demand images. The alleged perpetrators are depicted in 95 images that supplement the texts of the articles dealing with various types of violence. Of these, 42 are demand images, in which the alleged perpetrators are connected with violence in the linguistic context mainly through direct 'nominations' or action verbs in headlines, e.g., "female suicide bombers" (23.01⁶), standfirsts, e.g., "13-year-old boy who raped" (27.01), or captions, e.g., "Al Qaeda leader Osama bin Laden" (25.01).

Social distance. As stated earlier, social distance is connected with the size of the figure in the image, or proximity/distance. In the corpus, it was possible to identify close-ups (34 images) and mid-range (8) shots as they appear in the webpages of *The Telegraph*.

Among the close-ups showing (part of) the face or head with the upper shoulders of the alleged perpetrators, the viewer has a

Table 1 Personalization of alleged perpetrators in *The Telegraph* news reports (by gaze direction, camera range and angle).

Image type	Num. of images
Demand images (alleged perpetrators look directly at the viewer)	42
Range	34
Face/head-to-upper-shoulder	8
Head-to-chest/waist	36
Angle	6
Vertical	28
Eye-level	14
Camera below	28
Horizontal	14
Frontal view	53
Side view	
Offer images (alleged perpetrators look away from the viewer)	28
Range	13
Head-to-shoulder/chest	3
Head-to-waist/hip	9
Head-to-knee	27
Full figure	4
Angle	22
Vertical	7
Eye-level	46
Camera above	
Camera below	
Horizontal	
Frontal view	
Side view	

chance to look closely into the eyes of a “teenager jailed for killing 12-year-old sister” (9.01), “serial rapist” (27.01), “terror suspect” (27.01), “merchant of death” (23.01) and others. Twenty-two individuals in the photos are the alleged perpetrators accused of killing or causing substantial harm (e.g., rapists), while other 7 are suspects, accused celebrities, recruits and one “lone wolf BNP member” (15.01). Of these, 18 are shots that appear to be taken from driving licenses or police booking photos (e.g., “teenage criminal” (21.01), “murderer Graham Dean” (23.01), “suspected US serial rapist” (29.01), or “Detroit bomber” (3–7.01, 22.01, 28.01)). What seems salient in these images is the eyes of the offenders, since at a short viewing distance the salient features of the face are important (Hakala et al. 2016, 3). In 20 demand portraits, the salience is also signaled by the edges of the frame, which cut off the upper part of the head/forehead and/or part of the chin and neck. If we assume that such images imply a demand for a social relationship, then the intention of the producer is to make us cautious of those people, to make us look directly into the eyes of the “Detroit bomber” (7.01), “drugs baron” (3.01), or “most wanted terrorist” (15.01), as well as the subjects in other selected images. Interestingly, 18 shots are of males, of which 11 seem to be white Europeans. ‘Nomination’ (van Leeuwen 2008b, 286) is used in all the captions to the images to identify the represented social actors by their full names, e.g., Umar Farouk Abdulmutallab (3.01) and Kasha Peniston (9.01). The readers are given a chance to evaluate the perpetrators not only by their face, but also by their names.

To further identify the social actors, the headlines, standfirsts and sometimes captions (18 images) ascribe a role to the social actor through functionalization with nouns, verbs, or adjectives (van Leeuwen 2008b, 288). For instance, words like *murder/murderer* and their derivatives are used 11 times in the selected fragments, *death/dead* are used 9 times, and *kill/killer* 10 times. The social actors presented in such a way are alleged or convicted rapists (4 individuals), “killers” (12), including “mercy killers” (3), and terrorists or terror suspects (5). In this way, visual proximization is enhanced by linguistic proximization (see Cap 2010).

What additionally characterizes the demand images is the absence of background in many pictures (20 images in total). In

five images, the background is blurred, as the subjects have been photographed outside, and elements of their outwear can be seen. Among these pictures, four are of women. One of them is a female “driver who killed” (24.01), two are so-called mercy killers identified in the verbal context through words like “death” and “murder” (7.01, 17.01), and one is “female suicide bomber” (23.01). The male photo is of a former jihadist “recruit” who has gone through “rehabilitation” (31.01). In these photos, the faces are slightly angled to the right or left, except for the “female terrorist” (23.01). What seems more important in the faces are the emotions expressed, not any other context.

Some pictures (16 in total) feature an identifiable background. A “drugs baron” is pictured against what seems to be a door or window (3.01), a British contractor “accused of murdering two colleagues” is wearing a helmet standing against some blue and red background (21.01), and in two pictures the “Detroit bomber” is standing against some vegetation wearing a Nike cap (7.02). These pictures, except “Terence Gavan, a ‘lone wolf’ BNP member” (15.01), “British contractor” (21.01) and “a mother suspected of murdering her two young children” (28.01), have been taken at a greater distance from the subject’s face. According to Yan et al. (2018, 66), “human beings pay more attention to the objects and regions not only with dominant colors but also with close and compact spatial distribution.” Parts of images that are in contrast with their surroundings are detected on the basis of differences in color, intensity, and orientation (Achanta et al. 2008, 67); therefore, there is a natural difference in how attention is distributed between a subject against a uniform or complicated background.

Two images stand out: portraits of perpetrators whose faces are masked. The first one depicts a “female terrorist” (23.01), while the second shows “a man accused of carrying out a series of acid attacks” (10.01). In the first image, the camouflaged woman’s face is framed in such a way that part of her forehead and chin are cut off, with the effect of making more salient the eyes and mouth, which are visible in the slits of the mask. Additionally, the mask and the background are darker, in contrast to the open parts of the face: the eyes and mouth. What might strike the viewer is the calmness of the relaxed mouth and the directness of the gaze. The effect of proximization makes the image quite striking, while linguistically the social actor is functionalized (van Leeuwen 2008b, 288) as a “female terrorist”. In the second picture, the eyes of the social actor are not really visible, but the position of the head and the hand with the right palm raised open to the viewer create the feeling that the criminal is looking straight at the camera. Unlike the previous photo, the mask is loose and moved to the right of the face. Here the subject is of smaller size in the image and the background includes members of the police.

A smaller group of demand images portray an alleged perpetrator with the victim (4 images). The separate images are placed next to each other (except for the image of Ronnie Wood and his girlfriend (2.01)): e.g., a mother alleged to have “murdered brain-damaged son”¹⁸ featured with her son both looking directly at the viewer (26.01). In three images, the alleged perpetrator is positioned on the left and the victim on the right (Mantas Kraucevicius “found guilty of manslaughter” (30.01) is the only one whose image is positioned to the right of the victim). This group of portraits is arranged in line with traditional message distribution, i.e. the information given on the left side registers as familiar, while the right side conveys new information requiring special attention (Kress and van Leeuwen 2006, 179–185). Compositionally, these portraits are arranged like the “mutual” gaze portraits, so the viewer “looks into the eyes” of both the alleged offender and victim.

Among mid-range demand images there are images of two men who are both alleged offenders and victims (29.01, 23.01,

27.01). These images, both of men who allegedly committed murder defending their families and properties, are featured against their properties. Among the demand images the longest range photo shows a head-to-waist portrayal of a “90-year-old Second World War veteran who grabbed care home worker by neck” (26.01). The man, who “denies assault”, is depicted standing in front of a gate with a sign reading “Canford Chase”, which is the care home where the incident took place. Compositionally, the man appears in the right half of the picture, which means that he is presented as new information to the viewer. Some of the individuals in demand images are celebrities, i.e. Ronnie Wood and Stan Kenton, and therefore they are presented to us as someone whose image we know. Interestingly, certain photos of perpetrators accused or convicted of particularly heinous or unusual crimes, especially murder, become so well known that the individuals become celebrities after recurring displays in the media (van Leeuwen 2008a, 108, 138–139), e.g., “Detroit bomber” or bin Laden.

Social relation. As can be seen from Table 1, the majority (36) of the demand images appear at the same eye level as that of the projected viewer (van Leeuwen 2008a, 139). Demand images of this type seem to require our involvement in the situation, which is associated with crimes of various degrees of gravity. The viewer is invited, even compelled, to confront the perpetrators and assess them by their faces. In six images the camera appears slightly below the eye level of the alleged perpetrator or offender. For example, “the manager of a care home, who is accused of murdering two elderly residents” (27.01) is photographed outside with his wife from a slightly lower angle so he appears to be looking at the viewer from somewhat above. Along the horizontal angle, there are slightly more photographs showing the alleged perpetrators from the front (28 images) than from the side (14 images).

In society, violent perpetrators tend to be excluded from communities and treated as ‘others’ for what they have done; however, in the visual presentation, viewers are made to confront them, in a way that is usually negative. For instance, looking at the image of Umar Farouk Abdulmutallab (3.01), we see that his head is tilted to the right and his expression is not that of someone who repents his wrongdoing. This could potentially result in a negative perception of the accused, especially when coupled with the label provided by the article (“[t]he true picture of Islamic radicalism [...]”). In other words, the images require more engagement: negative attention in response to a putative threat, or curiosity regarding the other, but not affinity, despite the symbolic closeness of the frame. These relationships to the viewer in demand images might, in a way, also be interpreted in terms of social exclusion, as the function of such images is to identify individuals doomed to be excluded from the relative in-group of ‘good citizens’.

Offer images. Fifty-three offer images that depict alleged perpetrators mentioned in the articles were singled out. In this group of photos, “a real or imaginary barrier is erected between the represented participants and the viewers, a sense of disengagement, in which the viewer must have the illusion that the represented participants do not know they are being looked at, and in which the represented participants must pretend that they are not being watched” (Kress and van Leeuwen 2006, 120). Viewers are allowed to project their own narratives onto the subject to a greater degree.

Social distance. Offer images (see Table 1) of perpetrators generally appear in longer range shots varying from head-to-

shoulder/chest (28 images of 53 total), head-to-waist/hip (13), head-to-knee (3) to full-figure shots (9). A “continuous stream of social information” perceived by the viewer can include elements other than gaze, such as a person’s identity, markers of emotion, attractiveness, and other elements (Leopold and Rhodes 2010, 234). Verbal extra-photographic codes create a top-down approach to reading the image (Noorman et al. 2018). In our case, the social actors are placed in situations in which the emotional markers of the portrayed social actor are salient (Adams and Kleck 2005).

Head-to-shoulder/chest photos comprise 28 offer images which include images where the frame cuts part of the head of the alleged perpetrator and sometimes chin (8 images): Chemical Ali (25.01), Osama bin Laden (24–25.01), two images of ‘mercy killer’ Kay Gilderdale – one with her “seriously ill daughter” (26.01) and one alone (23, 25, 28.01), – “former UN inspector” (14.01), “‘Lady in the Lake’ killer” (25.01), “a wealthy landowner” (26.01), and “ex-army major” (5.05). Unlike similarly framed demand images, these 8 offer images have a brighter and more prominent background – none of them is a police shot or a document photo. Additionally, of these, a portrait of Osama bin Laden also appears among the demand images. In an offer image, Osama bin Laden is portrayed with a turban on his head, his left hand up, his mouth open as if speaking; he is set against a background that appears to contain Arabic writing. Kay Gilderdale attracted media attention for “attempting to murder her bedridden daughter” and being found not guilty (25.01). In the image with her daughter, she is pictured looking down, keeping her face close to the alleged victim, who is looking at the viewer. In this case, the victim is positioned to the right, and the engagement of the viewer is with her, but not her mother.

Other social actors appear in the number of head-to-shoulder/chest images. In four head-to-shoulder/chest images law enforcement agents are present, e.g., Amy Winehouse with two police officers (21.01). In two court sketches the figure of the “Detroit bomber” (8.01, 9.01) is somewhat disproportionately bigger than the image of the judge. “Taliban chief Hakimullah Mehsud” (17.01, 31.01) is captured with other militants in the background. Blurred images of people in the background are found in three more images (2.01, 19.01, 22.01).

Other alleged perpetrators in head-to-shoulder/chest photos (9) appear against various backgrounds. For example, Munir Hussain – also appearing in demand images – “freed from prison” where he was kept for “attacking a burglar” is featured in his car and in front of his home (20.10). The head-to-chest shots are predominantly wide-angled, except for the image of a “radical preacher” (4.01).

Mid- and long-range shots are generally used to include more than one social actor. The longer range allows to include more than one member. Of head-to-waist/hip images, six feature law-enforcement agents doing their duty of arresting/detaining the alleged perpetrator(s), e.g., “alleged members of a drug traffickers gang” are photographed with the Mexican Federal Police behind their backs (10.01). Militants of Nigeria (12.01), Shehab rebels (3.01) and Al-Qaeda members are captured holding weapons in groups. One image presents Pope John Paul II shaking hands with the “Turkish gunman” (11.01). A still from *Captain Corelli’s Mandolin* (13.01), “a Yemen soldier” (15.01) and a photo of the “self-confessed killer” (29.01) show single figures.

A head-to-knee sketch shows “the mother of one of the Edlington victims in an outburst after the boys were sentenced” (22.01) and the perpetrator turning his head towards her. Camouflaged “Nigeria rebels” (30.01) and “crime gangs” of Port-au-Prince (19.01) are photographed armed. These people are presented to us as more distant, as strangers (van Leeuwen 2008a, 139).

Long-range shots (9 in total) are reserved for groups of social actors: “\$10 Taliban” (28.01), immigrants taking part in a protest demonstration (12.01), and the “senior leadership of al-Qaeda” (3.01). Seven of the images show men with various weapons. None of these social actors are of white European origin. The distance symbolically points to these outgroups as a threat.

Social relation. Unlike demand images, offer images are more varied in terms of the shot angles from which social actors are depicted. Along the vertical axis, alleged perpetrators are presented at the eye level (27 images), from below (22) and from above (4). Forty-six images show social actors in question from the side, and only seven from the front. The alleged perpetrators presented in such a way range from common people allegedly committing murders, such as “Mother Kay Gilderdale [who was] found not guilty of murder” (25.01), “a wealthy landowner accused of murdering wife” (26.01), and a “jealous woman” (7.01), to organized crime and terrorists, who came into the focus of public attention through a chain of earlier reports, such as “one of the country’s most-wanted drug lords” (12.1) and the “Detroit bomb suspect” (8.1) or “Detroit bomber” (9.1), as well as famous public figures, including “Martin Amis, the novelist” (24.1) and Amy Winehouse (21.1). The head-to-shoulders portraits show people whose faces are angled away from the camera to the left or right in varying degrees. Such “sideline” positions (van Leeuwen 2008a, 139) shift the public away from a need to confront the alleged perpetrators. Images with law enforcement agents in view, which also tend to be mid-range shots, let the viewer know that the situation is being taken care of. Often these agents are also placed slightly behind or around the alleged perpetrator, making their image more salient against the uniforms.

The majority of long-range shots (head-to-hip/knee or full-figure) feature groups of people or individuals, mainly labelled as dangerous in context or co-text, which is also reinforced visually by showing them holding guns (e.g., “Taliban suicide squad” (29.01), “senior leadership of al-Qaeda” (3.01), “men claiming to be al-Qaeda members” (11.01)). Interestingly, these photos are also taken from slightly or even noticeably lower angles, as if highlighting the danger by ascribing more power to the alleged perpetrators, a move which seems to work in a similar manner to the close-up in demand images. The difference, though, is in the intention to make them appear dangerous but also distant, as these are mainly groups from countries other than Britain.

Discussion

While analyzing images, one should always remember that images are fragmentary in nature; therefore, they do not and cannot offer a wholistic representation of any object or person (Lowe 2019, 221). The selection of an image and its properties to portray alleged perpetrators is based on a need to engage viewers in the process of viewing and interpretation, focusing on form and content as well as language. Our perception of the image of a kid among the autumn foliage, such as that of Umar Farouk Abdulmutallab, inevitably changes when he is linguistically labelled as the “Detroit bomber”. The language used as part of the caption, headline, or article guides the audience’s interpretation, but not necessarily in a conscious way. After all, “[l]anguage has the power to create and maintain reality because it is itself an ordering device, a nomos creating tool” (Groppe 1984, 166).

At the same time, image manipulation through the choice of the range at which the person is photographed, the angle of viewing and symbolic interaction via the direction of the perpetrator’s gaze, projects the social actor as more or less dangerous. For instance, demand close-ups resembling or being police mug shots would inevitably carry a sense of danger associated with our

schematic knowledge behind the situation when mug shots are made. Similarly the visual representation of the “Detroit bomber” Umar Farouk Abdulmutallab (5.01), “a teenager who sexually assaulted a nine-year-old girl” (27.01), another “teenage criminal” who kicked terminally ill man to death (21.01), and nurse Colin Norris who murdered “four frail patients” (26.01) frames these people as equally dangerous.

Several aspects seem to influence the choice of framing. Geographical and/or political proximity is one of them and it explains why the newspaper gives so much attention to the “Detroit bomber” prosecuted in the USA but mainly portrayed in close-ups in the news, compared to other terrorists and terrorist organizations such as Al-Qaeda or “Nigeria rebels” who are photographed from a larger distance at a slightly or visibly lower angles, often in groups and with arms. The idea that “[t]here are two kinds of people in the world – criminals and good upstanding citizens/victims” (McKee 2003, 103) finds its way into the representation of alleged perpetrators according to the symbolically assumed degree of the gravity ascribed to their allegedly criminal deeds. It looks like the greater the danger, or rather, the worse the perception of the crime in Western society (in our corpus, Britain, US, Australia, majorly), the closer viewers are to the individual alleged perpetrator and the greater their perception of the threat. The dramatic or rhetorical effect of the images’ take on social relation seems to promote the message that “they are similar to us; they are among us”, hence the positioning of the viewer at eye level. At the same time, the physical (geographical) distance from extremely dangerous groups (Al-Qaeda, Yemen) results in their presentation through a longer-range shot and somewhat lower angle. Additionally, police mug shots “symbolically include” the police (who should be taking these photos) and imply that the justice is being done or to be done. In a similar manner both offer and demand images of the alleged perpetrators along with the law enforcement agents in the frame, point to the importance of the role of these latter social actors in preventions of violence. Yet, the projection of the alleged perpetrators in these images seems to be different: the presence of the police removes or mitigates the aspect of danger this individual has for the society and promotes trust in the law enforcement. For instance, an offer image of “mafia mobster” Giuseppe Bastone with an Italian police officer behind him appears along with the article entitled “Italy claims finally defeating the mafia” (9.01). On the other hand, the images of the alleged terrorists and organizations seem to appear as part of the legitimization of the ‘war on terror’, an ongoing international campaign launched after the 9/11 attack – a campaign taking place outside the target reading communities of the newspaper.

Another factor which seems to influence symbolic distance and relation in the alleged perpetrator representation is the exposure of the readers to the story over a period of time. Repeated exposure to the names and images of notoriously known individuals make them ‘familiar’ to the readers, as Osama bin Laden or Taliban leader Mehsud. This seems to result in the closer range of the social actor presentation. Thus, *The Telegraph* reader/viewer becomes accustomed to the perception of a particular image associated with a specifically labelled social actor. The same holds true for the representation of celebrities labelled in the texts as alleged perpetrators, such as the offer close-up image of David Copperfield whose rape case was closed “without charges” (13.01) or the demand close-up of David Ross, “the millionaire Tory party donor” (12.01). Both of these men had the cases dropped, and they appear smiling in the images supplementing the news. The representation is quite different from the alleged perpetrators deemed as more dangerous, such as a “man jailed over death of Baby P” (21.01), who appears serious and reserved with his lips pressed. This ‘non-confrontational’ stance of Copperfield’s or

Ross' images can elicit a more sympathetic or at least neutral reception in contrast to the demand image, for example, of Baker. Among other things, interpretation relies on how facial expressions can be read. Alleged perpetrators' faces (and sometimes their partial or full bodies) do not mediate production but are themselves the products of mass-media mediation, as many of the images are taken by professional photographers from (or cooperating with) various agencies, such as Reuters or *The Telegraph* itself. Additionally, perpetrators tend not to appear smiling or relaxed; the predominant emotion seems to be that of tension or indignation. Even if the alleged perpetrator is an "ex-army major jailed for grooming schoolgirls" (5.01) who appears to be smiling, the smile is only interpreted as one of contempt rather than happiness or any other positive emotion, and is set up to be perceived negatively in the context of the article and the labels used.

It is possible to project several potential communicative aims of making social distance short with the alleged perpetrators represented in close-ups: potential crime prevention by publishing images of accused or convicted offenders, vilification of targeted communities, such as "terrorist groups", or simply telling an emotionally gripping story to "sell newspapers" (in this case, to encourage web traffic or link sharing to stimulate greater ad revenue), such as "Pope John Paul II gunman" who wants to publish a multi-million pound book (11.01).

Connection of the representation with the emotional/evaluative appeal also relies on ideologies. As a right-leaning pro-Christian newspaper, *The Telegraph* paid increased attention to the 'mercy killers'. Dr. Jane Barton, who "faces action over morphine deaths of elderly patients" (17.01) and Frances Inglis, who got life sentence for "killing her severely disabled son" (7.01, 20.01, 22–23.01) are portrayed in demand close-up images. At the same time, "Mother Kay Gilderdale" who was acquitted of "murder attempt" of her terminally ill daughter is represented with her daughter or alone in an offer type of image. These three reported cases of female 'mercy killers' also reflect the societal debate about euthanasia. At the same time, *The Telegraph* ascribes social agency to these three actors by using linguistic clues of negative connotation, such as "murder" or "killing" talking about this form of violence.

Though law enforcement or other government representatives, witnesses, friends and family (except the photos where the alleged perpetrator is pictured with a victim, who is sometimes related to them as in case of Kay Gilderdale) are often excluded from the frame visually representing perpetrators, they are implicitly present in the interpretations of the images also through reference in the texts of the news reports.

One more case of variation in framing concerns the representation of "good upstanding citizens break[ing] the law" (McKee 2003, 103). For example, Munir Hussain appears in both demand (23.01, 27.01) and offer (20.01) images with regard to manslaughter of a burglar in self-defense protecting his own property. He is portrayed in more intimate setting and at a mid-range distance. Such types of alleged perpetrators, whose act of violence is deemed an act of self-defense, whose contribution to the society is viewed as significant, or the charges against whom get eventually dropped are usually shown against more intimate or recognizable backgrounds, for example Colin Philpott, who allegedly "stabbed a teenager [...] defending his family and property" (29.1) and was ultimately not charged.

Though mass-media platforms, *The Telegraph* is no exception, acquire and publish the images of alleged perpetrators to make them accessible to wider audiences, serving as a medium for circulation, the framing techniques applied to the images tend to follow some pattern. Even if the image is taken by a professional photographer from Reuters or Getty Images, or acquired from

someone who knows the perpetrator, there is a tendency to keep a similar frame, for example, with a blurred background.

Inclusion of some images, especially, demand police/document shots, is used in the reports with what seems to be the intention to socially exclude the individuals from the ingroup. One way to make sure the exclusion happens is by mentioning the individuals' names as well. By knowing the name and the face of the alleged perpetrator, law enforcement also makes sure they are recognized and reported, especially if they commit another crime. Such is the case of the "murderer who escaped prison three years ago" (23.01), who is depicted in a demand close up and whose name is mentioned in the caption. However, disclosing the alleged perpetrator's name and face could also be harmful, especially if the person is acquitted later. If public opinion has already formed, the person could potentially suffer from the prejudice, as ingroup exclusion mostly happens in the media before the courts reach a verdict. Negative verbal labels used in the media can then stick with the person for years, if not for life. The debate over including/excluding the names and images of the perpetrators has been a part of the broader discussion of the journalistic ethical standards (see e.g., Toney 2015; Corbett 2017; Marthoze 2017, etc.). Yet, as Toney, (2015) writes, the "codes of conduct (IPSO/Ofcom) and the law don't always provide a sanctuary for editorial decision making", and it is up to the individual newspaper to make a choice of disclosing personal information or not.

Conclusion

This case study of the strategies in framing of the alleged perpetrators as a group of social actors both visually and verbally showed how 'personalization' is achieved in *The Telegraph* news presentation. The alleged perpetrators are portrayed in *The Telegraph* news in a way that engages the audience through a mixture of visual manipulations and linguistic labels. Linguistic 'nominalization', or use of personal names, and mainly functionalization are used in the texts of the articles to define the role of the social actors and point to the act of violence committed, e.g., murderer, rapist, terrorist. As part of visual framing, salience is achieved through control of social relation, distance and interaction. The discourse serves as a tool which defines the position of social identity labelled in the discourse as a perpetrator along the 'safety' ⇔ 'danger' axis. Geographical and/or political proximity as well as legitimization of law enforcement/political actions plays an important role in the choice of visual framing: for instance, individuals presenting imminent danger to the reader mostly appear in close-up demand images, while distant terrorist groups tend to appear in long-range offer photographs.

To conclude, it appears that the function of the images of alleged perpetrators added to the message is two-fold: on the one hand, the image signals a warning to the audience about danger, but at the same time it legitimizes the legal actions necessary to safeguard public safety. After all, safety is one of the "apt categories" for understanding the media's "power to represent the world to the world" (Chouliaraki 2006, 4). Additionally, such framing fosters trust in the police, since such images show that law enforcement (or a governmental body associated with law and order) is able to assume or maintain control of a putatively dangerous subject. Frequently repeated media representation of accused terrorists, such as that of the "Detroit bomber" Umar Farouk Abdulmutallab, also become a part of the legitimization of state actions (see Cap 2010), for example, in the 'war on terror'. Ideology, to which the newspaper leans, influences social agency ascribed to individuals classified as 'perpetrators' in the discourse that the newspaper constructs. For instance, sometimes *The Telegraph* enters societal debates and contributes to them with the

view the newspaper adheres to, such as the debate about euthanasia. In the long run, audiences acquire knowledge about cultural codes from a multitude of texts and then draw intertextual parallels unconsciously in their interpretative efforts (Ott and Walter 2000, 429).

The case study presented here also has a number of limitations. First of all, it focused only on the representation of one type of social actors, i.e. alleged perpetrators. Yet, reports of violence also visually include other social actors, such as victims, law enforcement agents, on-lookers, etc., or exclude visual supplements altogether. In fact, “critical comparison of different representations of the same social practice” (van Leeuwen 2008a, 29) both via exclusion and inclusion could unveil further ideological interests and purposes the newspaper has with regard to its readers. Furthermore, though this case study does not allow to claim that the representation of alleged perpetrators is a fully established genre, the trends described and the function of the images in *The Telegraph* seem to indicate more than just a specific visual approach stemming from the nature of *The Telegraph* ideological stance as a populist, pro-Christian newspaper. A larger study across a variety of mass-media platforms is necessary.

At the same time, offering an interdisciplinary approach (combining the principles of social semiotics and CDA) allows an analyst to balance formalism/structuralism and contextualism in analyzing meaning making while reading and further interpreting visual and verbal signs used in media messages. Some scholars see Social Semiotics as a branch of CDA (e.g., Ghasemi 2023), or speak of Critical Social Semiotics (e.g., Caldas-Coulthard and van Leeuwen 2003) as an independent discipline, building upon Halliday’s approach to meaning potential based on social contexts. Focusing on how different semiotic resources organized in modes, which create a multimodal news report text, have different potential in meaning construction gives the scholar an opportunity to discuss not only social purposes but also sociocultural context around a violent event. Combining semiotic theory with sociological approach, critically analyzing social practices of constructing discourses, such as discourses on violence in focus here, provides a number of insights. For example, insight into the role(s) of framing, influenced by social and more specifically media platform preferences, favored propaganda, and adopted or represented ideology, in prompting, manipulating or regulating the way a society discusses and perceives alleged perpetrators.

Data availability

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request. The bibliography of the primary sources used to generate datasets during and/or analysed during the current study are available in Harvard Dataverse <https://doi.org/10.7910/DVN/ZYG95J>.

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Notes

- 1 See *The Telegraph*’s Editorial and Commercial Guidelines at <https://www.telegraph.co.uk/about-us/editorial-and-commercial-guidelines/>.
- 2 See <https://www.ipsos.com/uk/editors-code-of-practice/>.
- 3 The material presented in the article was collected and analyzed before *The Telegraph* changed its free access policy. At present (2023), access to the archive is no longer free of charge.
- 4 See <https://www.telegraph.co.uk/news/worldnews/northamerica/usa/7070363/Osama-bin-Laden-tape-wording-an-indicator-of-attack.html>.

5 As of October 2020, the images could be assessed according to year and month at this address: <https://www.telegraph.co.uk/archive/>.

6 Since all the images analyzed are of January 2010, the year is omitted in references.

References

- Achanta R, Estrada F, Wils P, et al (2008) Salient region detection and segmentation. In: Gasteratos A, Vincze M, Tsotsos JK (eds) Computer vision systems: 6th International conference, ICVS 2008. Springer; Santorini, p 66–75
- Adams RB, Kleck RE (2005) Effects of direct and averted gaze on the perception of facially communicated emotion. *Emotion* 5(1):3–11. <https://doi.org/10.1037/1528-3542.5.1.3>
- Baker P, Gabrielatos C, McEnery T (2013) Discourse analysis and media attitudes: the representation of Islam in the British press. Cambridge University Press, Cambridge
- Caldas-Coulthard CR, van Leeuwen THJ (2003) Critical social semiotics: introduction. *Soc Semiot* 13(1):3–4. <https://doi.org/10.1080/1035033032000133481>
- Cap P (2010) Proximizing objects, proximizing values: towards an axiological contribution to the discourse of legitimization. In: Okulska U, Cap P (eds) Perspectives in politics and discourse. John Benjamins, Amsterdam, p 119–142
- Caple H (2006) Photojournalism: a social semiotic approach. Palgrave Macmillan, London
- Chouliaraki L (2006) The spectatorship of suffering. Sage, Noida
- Corbett PB (2017) When we name names. *The New York Times*. <https://www.nytimes.com/2017/04/15/insider/sexual-assault-naming-victims-standards.html>. Accessed 20 Oct 2023
- D’Angelo P (2017) Framing: media frames. In: Rössler P, Hoffner CA, van Zoonen L (eds) The international encyclopedia of media effects. Wiley, New York, p 1–10
- Djonov E, Zhao S (2016) Critical multimodal studies of popular discourse. Routledge, New York
- Entman RM (1993) Framing: toward clarification of a fractured paradigm. *J. Commun.* 43(4):51–58
- Gillespie LK, Richards TN, Givens EM, Smith MD (2013) Framing deadly domestic violence: why the media’s spin matters in newspaper coverage of femicide. *Violence Women* 19(2):222–245. <https://doi.org/10.1177/1077801213476457>
- Ghasemi SS (2023) A mini review of social semiotic and critical visual studies in language-related fields of study. *IJASHSS* 12(4):268–281. <https://doi.org/10.22034/ijashss.2023.383709.1134>
- Groppe JD (1984) Reality as enchantment – a theory of repetition. *Rhetor. Rev.* 2(2):165–174
- Hakala J, Kätsyri J, Takala T, Häkkinen J (2016) Perception of stereoscopic direct gaze: the effects of interaxial distance and emotional facial expressions. *J. Vis.* 16(9):1–15. <https://doi.org/10.1167/16.9.5>
- Haynes J, Hennig A (eds) (2011) Religious actors in the public sphere: means, objectives and effects. Routledge, London and New York
- Johnston H, Noakes JA (eds) (2005) Frames of protest: social movements and the framing perspective. Rowman & Littlefield Publishers, Lanham
- Jones RH (2012) Multimodal discourse analysis. In: Chapelle CA (ed) The encyclopedia of applied linguistics. Blackwell, Oxford. <https://doi.org/10.1002/9781405198431.wbeal0813>
- Jones RH, Norris S (2005) Discourse as action / discourse in action. In: Norris S, Jones RH (eds) Discourse in action: introducing mediated discourse analysis. Routledge, Oxon, p 3–14
- Kress G (2010) Multimodality: a social semiotic approach to contemporary communication. Routledge, London
- Kress G, van Leeuwen T (2001) Multimodal discourse: the modes and media of contemporary communication. Arnold Publishers, London
- Kress G, van Leeuwen T (2006) Reading images: the grammar of visual design. Routledge, London and New York
- Ledin P, Machin D (2018) Multi-modal critical discourse analysis. In: Flowerdew J, Richardson JE (eds) The Routledge handbook of critical discourse studies. Routledge, London and New York, p 60–76
- Leopold DA, Rhodes G (2010) A comparative view of face perception. *J. Comp. Psychol.* 124(3):233–251. <https://doi.org/10.1037/a0019460>
- Lowe P (2019) Framing the perpetrators: Lee Miller’s photography of the liberation of Dachau. *J. Perpetrator Res* 2(2):2016–2223. <https://doi.org/10.21039/jpr.2.2.53>
- Maalej D (2019) Media agenda-setting and framing in the Second Gulf War. Cambridge Scholars Publishing, Newcastle upon Tyne
- Machin D, Mayr A (2013) How to do critical discourse analysis: a multimodal introduction. Sage, London
- Marthoize J-P (2017) Terrorism in the media: A handbook for journalists. UNESCO, Paris
- McKee A (2003) Textual analysis: a beginner’s guide. Sage, London
- Messariss P, Abraham L (2010) The role of images in framing news stories. In: Reese SD, Gandy OH Jr, Grant AE (eds) Framing public life: perspectives on media and our understanding of the social world. Routledge, New York and London, p 215–226

- Nesdale D (2011) Social groups and children's intergroup prejudice: Just how influential are social group norms? *An. de. psi* 27(3):600–610
- Nevala M (2019) Two miserable creatures or those atrocious criminals? Evaluative reference in the Mannings murder reporting. In: Lutzky U, Nevala M (eds) *Reference and identity in public discourses*. John Benjamins, Amsterdam and Philadelphia, p 19–41
- Noakes JA, Johnston H (2005) Frames of protest: a roadmap to a perspective. In: Johnston H, Noakes JA (eds) *Frames of protest: social movements and the framing perspective*. Rowman & Littlefield, Oxford, p 1–29
- Noorman S, Neville DA, Simanova I (2018) Words affect visual perception by activating object shape representations. *Sci Rep.* 8 <https://doi.org/10.1038/s41598-018-32483-2>
- Norris S (2011) *Identity in (inter)action: introducing multimodal (inter)action analysis*. De Gruyter Mouton, Göttingen
- Ott B, Walter C (2000) Intertextuality: interpretative practice and textual strategy. *Crit. Stud. Media Commun.* 17(4):429–446
- Pickett CL, Brewer MB (2004) The role of exclusion in maintaining ingroup inclusion. In: Abrams D, Hogg MA, Marques JM (eds) *Social psychology of inclusion and exclusion*. Psychology Press, New York, Hove, p 89–112
- Reese SD (2001) Framing public life: a bridging model for media research. In: Reese SD, Gandy OH Jr, Grant AE (eds) *Framing public life: perspectives on media and our understanding of the social world*. Erlbaum, Mahwah, p 7–31
- Scheufele DA (1999) Framing as a theory of media effects. *J. Commun.* 49(1):103–122. <https://doi.org/10.1111/j.1460-2466.1999.tb02784.x>
- Tannen D, Hamilton HE, Schiffrin D (eds) (2015) *The handbook of discourse analysis*. John Wiley & Sons, Inc., New York
- Toney J (2015) A lesson in journalism ethics, to name or not to name is the question. *News associates*. <https://newsassociates.co.uk/a-lesson-in-journalism-ethics-to-name-or-not-to-name-is-the-question>. Accessed 20 Oct 2023
- van Dijk THA (2000) *Ideology: a multidisciplinary approach*. Sage, Thousand Oaks
- van Leeuwen T (1996) The representation of social actors. In: Caldas-Coulthard CR, Coulthard M (eds) *Texts and practices: readings in critical discourse analysis*. Routledge, London and New York, p 32–70
- van Leeuwen T (2005a) *Introducing social semiotics*. Routledge, New York and London
- van Leeuwen T (2005b) Multimodality, genre and design. In: Norris S, Jones R (eds) *Discourse in action: introducing mediated discourse analysis*. Routledge: Oxon, p 73–94
- van Leeuwen T (2008a) *Discourse and practice: new tools for critical discourse analysis*. Oxford University Press, Oxford
- van Leeuwen T (2008b) The representation of social actors. In: van Dijk TA (ed) *Discourse studies*. Sage, London, p 268–302
- Wodak R (1999) Critical discourse analysis at the end of the 20th century. *Res Lang. Soc. Interact.* 32(2):185–193
- Wooffitt R (2005) *Conversation analysis and discourse analysis: a comparative and critical introduction*. Sage, London
- World Health Organization (WHO) (2002) *World report on violence and health: summary*. World Health Organization, Geneva. https://www.who.int/violence_injury_prevention/violence/world_report/en/summary_en.pdf. Accessed 30 Jan 2020

- Yan Y, Ren J, Sun G et al. (2018) Unsupervised image saliency detection with Gestalt-laws guided optimization and visual attention based refinement. *Pattern Recognit.* 7:65–78

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This article does not contain any studies with human participants performed by any of the authors.

Additional information

Correspondence and requests for materials should be addressed to Svitlana Shurma.

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