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CONSTRUCTING KNOWLEDGE WITHIN THE PHOTOGRAPHIC APPARATUS

This article brings together three disciplines with different scholarly, methodological and theoretical views on photography: media studies, visual art and perceptual psychology. Our multidisciplinary approach focuses on the operations of the photographic apparatus, an umbrella concept that allows us to examine the construction of knowledge within a wide range of practices, technologies and discourses. Following Hans Belting's anthropological iconology, we propose that while examining photographic images, it is also important to recognise their non-iconic determinants — namely, the workings of the medium and the bodies implicated. The common denominator to our joint endeavour is the disposition of procedural knowledge constructed within the social, technological and psychological processes of photographic mediation. We argue that recognising the connective function of images as links between the sensory and ideational modes of knowing is paramount to acknowledging the epistemic implications of photographic images in current visual cultures.

Introduction

Today's societies are saturated by visual media. Dynamic and ubiquitous digital imagery, facilitated by nimble appliances such as smartphones or tablets, allows us to forget that these images are generated with a multitude of photographic technologies. Indeed, our relation to visual media may prove rather affective and unreflective on closer inspection. To tackle the spell of new media, we need to

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learn more about the epistemic foundations of the photographic apparatus, that is, about the practices, technologies and discourses that contribute to the construction of the technologically enhanced human sensorium. Predisposed to continuous mediation, we are likely to take the flux of images for granted, thereby dismissing the medium-specific, artefactual aspects that condition the ideational impact of images. In many respects, our interaction with media technologies poses something of a paradox: in search of relevant visual information, we trust the illusions. As images are often regarded as intrinsic and self-evident elements of the human lifeworld, their social and psychological aspects as well as their technological conception are prone to remain unacknowledged or black-boxed.

The epistemology of images has many facets; images can *transmit information*, *represent things* and *operate* in various technical, social and psychological settings. Within photography theory, the epistemological foundations of the photographic image and the camera's role in the organisation of the visible have been subject to long-lasting discussions. Scholars interested in the philosophy of photography have addressed epistemic questions such as how the distinction between visible and invisible is established, how the camera (*obscura*) is harnessed to model human visual perception and how the photographic apparatus is implicated in different practices aimed at producing verifiable knowledge.¹

Seconding the literature where the epistemic agency of images and their capacity to mediate visual knowledge are widely acknowledged,² we propose shifting the focus from questions of transparency and visual objectivity to the connective power of images. We believe that a multidisciplinary exploration into the interactive strands of photographic mediation is key to grasping the photographic images' cultural nature and to understanding the way they function as links between subjective and shared realities. These critical aspects have to some extent been overshadowed by discourses that revolve around the veracity of the images and subscribe to representational theories of knowledge.

In this article, we bring together three disciplines with different scholarly, methodological and theoretical views on photography: media studies, visual art and perceptual psychology. Our approach especially draws from Hans Belting's anthropological iconology, in which he proposes that to fully acknowledge the epistemic affordances of images, and to reflect on their meanings and purposes, we ought to pay closer attention to their non-iconic determinants — namely, the workings of the medium and the bodies implicated.³ In our shared understanding, Belting's determinants — image, medium and body — are all part of the *photographic apparatus*, an umbrella concept that allows us to examine epistemic operations within a wide range of practices, technologies and discourses.

Embracing the idea of the image as an event,⁴ we propose that the epistemic core of images lies in their capacity to function as connective *links between the sensory and ideational processes of knowing*. However, to become invested with meanings, or to be 'animated', images require both media and bodies.⁵ Belting brings this dilemma to the fore when he mentions that 'Images are neither on the wall [...] nor in the head alone. They do not exist by themselves, but they happen [...] via transmission and perception.'⁶ Thus, media, as 'the agent by which images are transmitted', and the

performing or perceiving bodies constitute the epistemic prerequisites for images to operate, to represent and to transmit information.⁷

Following Belting,⁸ we depart from a narrow-scoped analysis of the representative iconic content to adopt a broader perspective that also acknowledges the procedural knowledge embedded in images. Our key research question is *how is knowledge constructed and transmitted within the photographic apparatus?*

We approach this question by examining three different but overlapping photographic practices and further consider *what kind of knowledge is produced and how the perceiving subject is intertwined in these practices.*

- We first discuss *interpersonal photographic communication through Snapchat*, a highly popular social media platform, and examine the role of indexicality in creating and maintaining *interpersonal knowledge*.
- Second, we consider *situated knowledge embedded in the process of imaging*. To make a connection between the images and the techniques from which they came about, we study photographic images *through visual artworks* that open the black-box of imaging technologies.
- Third, we examine the role of *embodied a priori knowledge* that conditions subjective *visual epistemology in experimental psychology*. This sedimented knowledge of photographic practices underpins our cognitions and emotions of photographic images. We also discuss metacognitive awareness of photographic images as objects and elaborate on its implications for media literacy.

Acknowledging the different discourses, terminologies and points of views related to our scholarly backgrounds, we fully endorse Samarajiva's conclusion: 'An interdisciplinary approach is easy to prescribe but difficult to do'.⁹ Thus, we do not expect to create a solid body of knowledge free from discontinuities or aberrations. On the contrary, our multidisciplinary aim is to bring together our different scholarly approaches and to generate what might be called a *bricolage*, a prismatic view in which different approaches coexist and complement each other to shed light on the epistemologies of the photographic image. The common denominator to our joint endeavour is the disposition of procedural knowledge, constructed within social, technological and psychological processes of photographic mediation. With our examples derived from Snapchat communication, visual artworks and psychological research, we wish to exemplify how an analysis of the epistemic stakes in photographic mediation may contribute to an understanding of the apparatus's operations and shed light on the affordances it offers for generating, transmitting and manifesting knowledge.

Interpersonal knowledge through photographic communication

Past discussions on the epistemology of the photographic image have comprehensively addressed the issue of the veracity of the representative iconic content. Similarly, epistemology in general has primarily focused on propositional knowledge.¹⁰ In this section, our focus is on the practice of interpersonal photographic communication and

accordingly on a less explored area of knowledge — interpersonal knowledge, constructed within social processes of photographic mediation. Following our key research problem, we ask: *How is interpersonal knowledge constructed within the photographic apparatus?*

In interpersonal photographic communication, an ideational or material connection, often called ‘indexical’, appears to be important in terms of the knowledge produced.¹¹ Herein, we temporarily set aside the iconic qualities of the photographic image to focus on its indexical quality. At the end of this section, our main example focuses on interpersonal communication through Snapchat, an ephemeral social media platform. Snapchatting offers a pronounced example of the epistemological significance of the indexical connection, as photographs sent through the application are often considered to be low in informational iconic content. However, to lay the foundation for our discussion, we take a few steps back in the history of photography theory specifically in terms of the extensive discussions concerning indexicality.

During the 1980s, as ‘photography as theoretical object’ was invented, photography theory was dominated by discourse on specificity that tended towards essentialising photography and was guided by such ideas as Roland Barthes’ ‘ça-a-été’ (that-has-been)¹² and ‘index’, a notion borrowed from Charles Sanders Peirce.¹³ Barthes suggested that in photography, a superimposition of reality and past exists because one can never deny that ‘the thing has been here’.¹⁴ Hence, he named the essence, the ‘noeme’, of photography as ‘that-has-been’.¹⁵ Peirce famously conceptualised the photographic image as an indexical trace left behind by the light coming from a photographed scene.¹⁶ His illustrative examples of the indexical sign function, fingerprint and weather vane, stressing both causal connection and continuity, offered an influential point of reference for theories of photographic indexicality.¹⁷

Since the 1990s, photography theorists have debated the differences between analogue and digital photography and addressed the conceptions of photography (i.e. ontological questions) also in technological terms. In these discussions, the question of indexicality — that is, whether physical causality still operates in digital photography — has been thoroughly considered.¹⁸ Thus, we do not attempt to address the question here. Our starting point herein is that the indexical chain still operates after digitalisation. In other words, although digitalisation has altered the quality of photography’s indexical link to reality (from analogous or chemical to digital), it has not eliminated the indexical link. Digital photographs are still traces left by the light reflected from the photographed scene, although those traces might be weaker or digitally modified. Furthermore, even if we would conclude that the indexical link has disappeared at the technical level, we could still reasonably say that the link continues to operate at the level of social discourse concerning our daily understanding of the photographic image.¹⁹

This photographic indexicality is often discussed as something that affords truth — that is, as the source of the veracity of photographic images. However, within current practices of interpersonal photographic communication, indexicality is specifically interesting because it affords proximity. Indexicality, as either a materially or ideationally established link, brings the photographic image exceptionally close to

the objects it represents. This link provides the viewer with a strong sense of presence and proximity of the photographed objects. Following Peirce and Barthes,²⁰ we may claim that owing to indexicality, this sense of presence is stronger in photographic images than in other types of images, such as paintings and drawings. In situations where the communicative parties are not in the same physical space, due to its indexicality, the photographic image may serve as an exceptional vehicle for the sense of presence needed for creating and maintaining interpersonal knowledge.²¹ This interpersonal knowledge, which is a form of objectual knowledge, refers to two subjects knowing each other personally and is not reducible to propositional knowledge about persons.²² It requires subject-to-subject interaction in order to develop and be sustained. In other words, enough recurring personal encounters of reciprocal perceptual contact make for interpersonal knowing.²³

Snapchatting is a current photographic practice that presents an apt example not only of the epistemological significance of indexicality but also of the interplay of the image, body and medium when images happen.²⁴ On Snapchat, a camera-based social media platform, users share ephemeral photographs (or videos) with their friends. As the sent photographs, or snaps, are automatically deleted after they have been viewed, Snapchat is not mainly used for communicating formal or important issues that would require storing of the snaps. It is used for playful, quick commenting, inside jokes, funny remarks and light chit-chat.²⁵ The making of playful representations appears to be in the core of the practice. The filters (augmented reality) and other creative tools of Snapchat add to the possibilities of the playful manipulation of reality. Thus, truth as an affordance of indexicality appears to not be of critical importance within this practice.

However, in relation to the proximity it affords, indexicality appears to be of utmost importance in Snapchatting. A large part of the communication through Snapchat may be described as photographic phatic communication,²⁶ which is commonly understood as a mode of communication where the significative content of the used utterance gives way to the social bonding function of the utterance itself.²⁷ In other words, in phatic communication something of importance takes place even when the ‘speaker’ or the ‘recipient’ are not paying much attention to the particularities of the communicated content.²⁸ It appears that phatic photographic communication accounts for ‘personal encounters of reciprocal perceptual contact’ needed for creating and maintaining interpersonal knowledge largely because of the sense of presence they entail. In this context, Green and Lowry’s suggestion that photographs are not indexical just because light happened to be recorded but because photographs were in fact *taken* seems particularly fitting — the performative gesture ‘that draws reality into the image field’ works itself as a form of indexicality.²⁹

In previous research, when studying Snapchat use among young close friends, Niemelä-Nyrhinen and Seppänen noted that, in addition to photographs with communicative iconic content, their study participants routinely sent to their friends photographs that they had taken without giving practically any thought to the iconic content of the image.³⁰ They had just taken a picture with the camera of their phone (front or rear) that happened to be open when they entered the application, regardless of where the camera was pointing, and sent it. This spontaneous practice resulted in multiple snaps picturing research participants’ whereabouts and feet in the data. However, the

participants highlighted in the interviews that there is a difference between sending a snap that entails a photograph (even if the content is not given any conscious thought) and sending a snap ‘without’ a photograph (this is done, for instance, by covering the camera). Thus, the sense of presence conveyed by photographic images appears not to be necessarily dependent on the receiver’s detailed analysis of the iconic content of those images.³¹ Any photographic image taken by a communicative partner, for instance, an image of one’s whereabouts, may entail a sense of presence similar to that entailed in an image of one’s face (e.g. a selfie) or feet, for that matter (Figure 1).

However, this does not mean that the iconic content would be entirely irrelevant or without meaning even in the instances described above. We argue, first, that it is meaningful because photographic iconicity is still interpreted as something that reveals the indexicality of the photographic image. Through photographic iconicity, people recognise the image as a photograph — that is, as ‘a trace left by the light’, created through the performative act of photography. Thus, without any iconic content, the sensed presence may be weaker, as it is not based on the indexicality of the photographic image. Second, the iconic content may entail, similar to face-to-face encounters, a rich array of indices of the communicative partners’ identities and the quality of their shared bond (e.g. objects of shared interests) relevant to the present and the future of their mutual relationship.³³

As Belting suggested,³⁴ to fully grasp the meanings that these images entail or the knowledge they provide requires consideration of not only the images but also their non-iconic determinants — that is, body and medium. From the perspective of a researcher, the reading of images sent, for example, through Snapchat would be quite different without an understanding of photography as an indexical medium that affords sensations

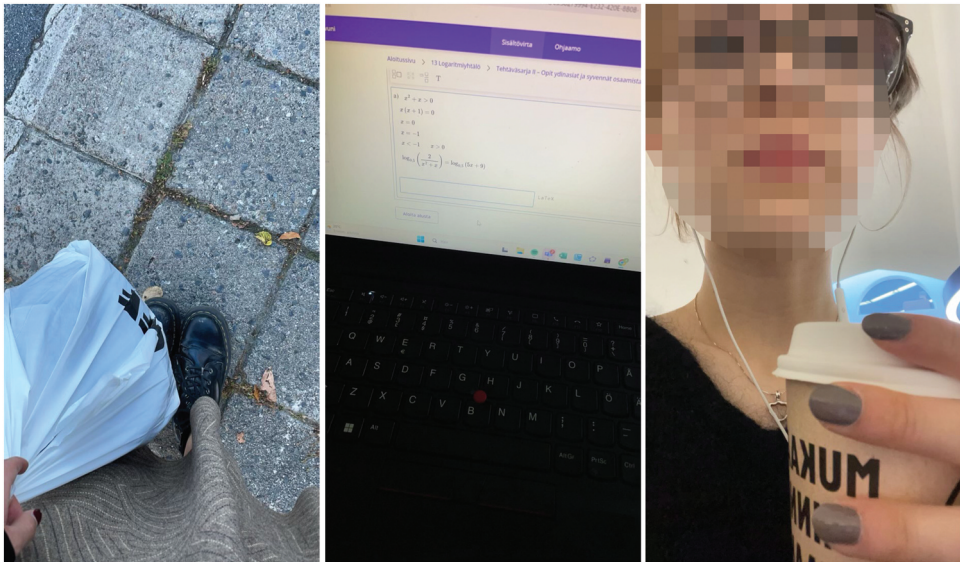


Fig. 1. Typical photographs sent to friends through Snapchat by young research participants.³²

of proximity, without an understanding of Snapchat as a playful and ephemeral medium or without any access to the sensations and thoughts of the perceiving bodies and their shared imaginaries. In interpersonal photographic communication, the connective function of images is twofold; they serve both as connective links between sensory and ideational processes of knowing and as connective links between communicating bodies.

This first section particularly focuses on the sense of presence needed for creating and maintaining interpersonal knowledge. Thus, the aim is to highlight the epistemic role of one specific quality of the photographic image — indexicality — within the photographic apparatus and in the context of current communicative practices. The second section examines artworks through which spectators are invited to eyewitness the technical operations that create photographic images, focusing on knowledge situated in these processes.

Situated knowledge inherent in imaging technologies

To continue from mediated communication to the very techniques of mediation, this section considers the material-discursive condition of technical images. We will study the *modus operandi* of photographic technologies and look at the *chain of imaging* — that is, procedural knowledge related to the operations and technical infrastructures that produce the images and condition their distribution. Drawing from constructivist epistemology, Science and Technology Studies and post-phenomenological perspectives on technologically mediated *situated knowledges*,³⁵ we strive to understand the epistemic stakes of technical infrastructures. To understand how the interfaces operate and how the technologies impact the function and the visual makeup of the photographic outcomes, we ask: *How is situated knowledge constructed through and within the process of imaging?*

Photographic images can be claimed as transparent representations only through bracketing the media technologies whose operation is often taken for granted. Peter Osborne has stressed the relevance of the technological and social factors that condition the imaging process. Instead of a direct relationship with the real (the indexical model), Osborne has invited us to look at the *distributed* character of the photographic image. Images operate through complex networks, and they undergo pictorial transformations which derive from various social and technological practices.³⁶ The distributed epistemology proposed by Peter Osborne resonates well with Bruno Latour's argument on the construction of scientific facts. Stage-by-stage, a solid chain of references is built, starting from the collection of samples in the real material world and ending with abstract figures, images and texts.³⁷

Latour argues that the empirical method of translation used for producing 'facts of nature' by interlinking material evidence to representations offers both a vantage point and the means to extract and articulate knowledge. Thus, the ideational and metaphysical can always be related and traced back to the concrete. The chain of references bridges the gap between the scientist and the natural world, and in doing so, it allows scientists to deal with visual records as epistemic objects. In a similar vein, we find that the veracity of photographic images derives from the methods and techniques implicated in their conception. Following Belting, we argue that photographs 'happen' within the photographic apparatus, where the production and distribution of images 'take place' through

multifaceted technological interfaces: ‘The more we pay attention to a medium, the less it can hide its strategies. The less we take note of a visual medium, the more we concentrate on the image, as if images would come by themselves’.³⁸

Likewise, Ihde and Selinger have considered the epistemic impact of a medium’s technical operation: ‘Knowledge production is modelled upon a specific technology — and both its strengths and problems relate to the limitations of that specific model’.³⁹ The technological affordances are also highlighted by Vilém Flusser who stresses the photographers’ ‘endeavour to exhaust the photographic program’ in pursuit of ‘the realisation of camera possibilities’.⁴⁰ Embracing Flusser’s proposal to explore the *embodied, situated* disposition of technologically mediated images, we will elaborate on selected artworks which serve as experimental settings for studying how knowledge is constructed through the *chain of imaging*.

To relate photographic images with the methods from which they came about, we start by discussing two artworks by Tuula Närhinen. Instead of concealing the photographic techniques implemented, installations such as the *Drop Tracer* and the *Wave Screen* demonstrate the epistemic potential that resides within the imaging process.⁴¹ Through exhibiting the chain of events that begins with the recording of the traces, both artworks establish analogue feedback loops that reveal the operation of the instruments and hence showcase the iterative dynamics underpinning photographic mediation.

Drop Tracer (2011) includes glass slide frames sensitised with soot and exposed to rain, enlargements of the splash patterns created by the raindrops (Figure 2) and footage that allows the spectator to experience the duration and impact of the splotches captured on video. When a raindrop hits the soot-coated glass surface, air trapped under the droplet lifts tiny particles of soot that scatter and create splash patterns. The soot-coated glass functions as a sensitive picture plane that allows the momentum of the splash to inscribe itself on the black surface, not unlike light that exposes a frame of photographic film. Falling on 35-mm glass slides, the raindrops leave traces that remain visible even after the water has evaporated. Närhinen placed a contact microphone under the slide to capture the sound of the collision and to record it on video. The slides with the splotches were scanned and enlarged into black and white pigment prints on paper.⁴²

Wave Screen (2009) features an instrument that makes caustic wave patterns visible (Figure 3). The simple instrument is reminiscent of *camera obscura*. It comprises a translucent screen frame, enveloped by a black box that shades the screen and protects it from direct sunlight. The box is placed on an easel close to the water surface and aimed at the sun. When the wind blows, it mobilises the water surface and turns it into an oscillating network of concave and convex wavelets that serve as optical lenses that gather and reflect sunlight on the translucent screen. The converging lines of light formed by the caustic wave patterns are captured in still images, and their movements are recorded on video. The installation includes the ‘Do it yourself’ (DIY) instrument, instances of the wave patterns exhibited as a series of photographs as well as a video projection. The video ends with a scene where a large wave drenches the entire screen, thus effectively destroying its own image.⁴³

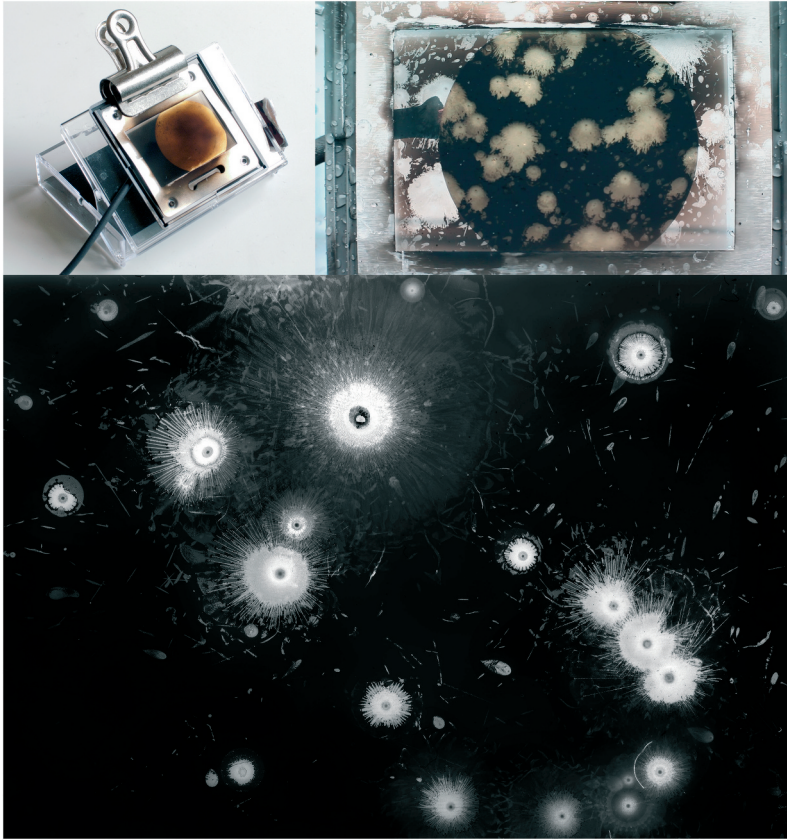


Fig. 2. Tuula Närhinen, *Drop Tracer* (2011), details of the work.

Images of raindrops or waves were constructed in front of the viewer's eyes while also being decomposed into their constituent parts. In Belting's terms, we can argue that the different aspects of the image event — 'image, body and medium' — are intentionally set apart in Närhinen's installations. The works exhibit the spatial and durational aspects of the image event by exposing the medial translations. The knowledge is constructed within the process of imaging — (re)produced by the devices, requisites and methods — from the very phenomenon to the exhibited artwork. Although the causal relations, such as aspects of mechanical indexicality, play a key role in Närhinen's artworks, the installations document the conception of the images in a manner that both the making of the inscriptions and the gradually evolving tracing process — that is, the instantaneous emergence of autographic rain or wave patterns — are allowed to be explored by the observer.

Mika Elo has proposed to consider Olia Lialina's *Summer* (2013) as an example of a digital artwork that both visually reveals and conceptually builds upon the invisible processes that occur on the hidden technological 'subface' of

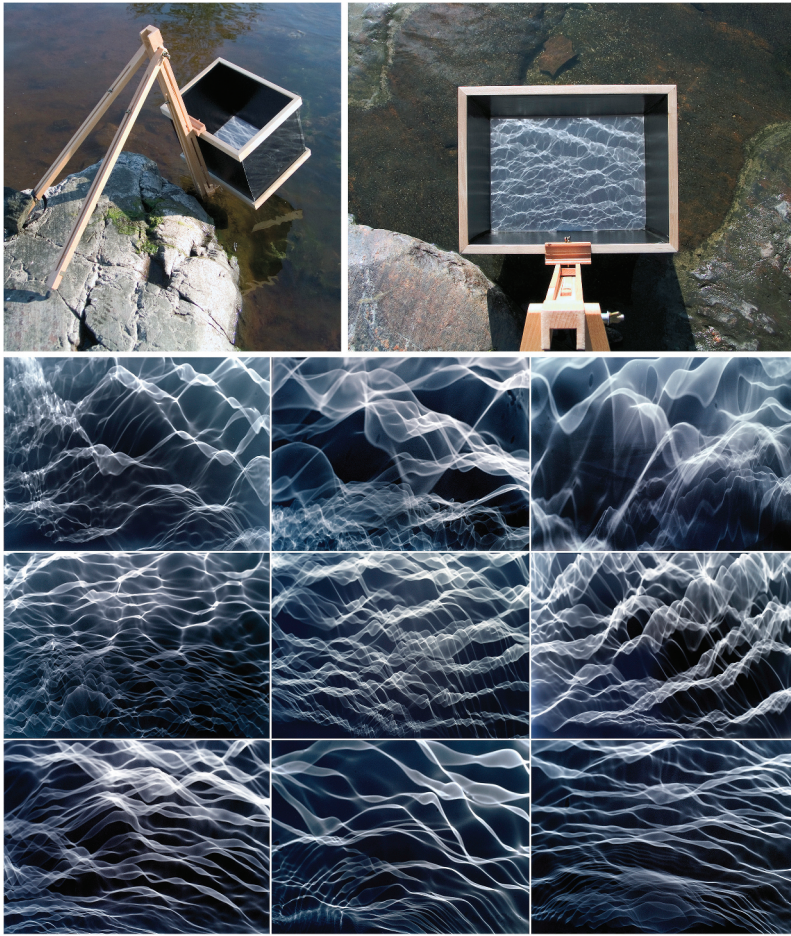


Fig. 3. Tuula Närhinen, *Wave Screen* (2009), details of the work.

the photographic apparatus.⁴⁴ The work is an animated sequence of snapshots showing a young lady (Lialina herself) swing to and from the screen, as if her swing board was suspended from the browser window. Instead of using a continuous Graphics Interchange Format (GIF) animation, the stuttering pendulum movement in *Summer* is created by letting each frame playback through different local hosts. The redirecting between the websites is indicated by the quickly alternating Uniform Resource Locators (URLs) in the text field of the address bar. Elo noted that according to Lialina's concept, a minimum of 18 hosting parties are needed to store all the frames required for smooth playback.⁴⁵

Summer hints at the ways in which the photographic script extends beyond the visible in the new technological environment of photographic images. The flickering of the URLs not only technically contrives the animation but also yields the movement of the swing. If the redirecting between the hosts stops, then the image will

freeze. In *Summer*, a hidden technological component, such as the typically invisible infrastructure of the hosting parties, suddenly becomes visually relevant. The technology both facilitates the animation and conveys its meaning. In this respect, *Summer* constitutes an example of the ways in which a ‘dynamic data object’⁴⁶ can function as an epistemic contingent that engages the spectator and directs their attention from the cinematic effect to the technology underpinning the moving image. Thus, the framework that conditions the display of the animation also provides for its ideational content and meaning.

The swinging lady as an iconic feature represents only a fraction of the image event in question. This is typical to the current media landscape, where the veracity of photographic images appears in new light. ‘Indexicality’ as the paradigmatic trope in various ‘authenticating legends’⁴⁷ of photographic cultures seems to have lost part of its currency, at least when indexicality is considered symptomatic of mechanical causality and therefore regarded as the ultimate warrant for truthful representations.

The artworks in this section have testified that the connective power of images does not exclusively reside in the recorded traces, often misconceived as the paramount of the photographic event. Peter Galison has described the pictorial dialectic in scientific imaging: ‘The image itself is constantly in the process of fragmenting and reconfiguring’.⁴⁸ Information that results from the imaging process unfolds through multiple translations between various kinds of renditions on different technological platforms. The distributed *chain of imaging* counts for the connective function and therefore justifies the realism ascribed to photographic mediation. The following section focuses on the human end of the chain: the critical observer who interprets the images.

Procedural knowledge and the embodied subject

The following psychological approach elaborates on the previous angles of interpersonal communication and imaging technologies. Belting’s conceptualisation — including the image, the medium and the body — offers a useful framework here too, as it considers both the embodied subject and the artefacts made for interpersonal communication, that is, the photographs, as the determinants of subjective visual epistemology.

We first discuss procedural knowledge, which manifests itself in photographic practices and in the subjective experience. It is a form of embodied knowledge that is stored in procedural memory.⁴⁹ Procedural memory not only stores our learned abilities but also dictates how we respond to different stimuli. Standardised image stimulus databases, such as the International Affect Picture System (IAPS) and Open Affective Stimulus Image Set (OASIS) are selected as the case examples because they intuitively illustrate the embodied nature of perception. Later, we discuss propositional knowledge as a derivative of the embodied procedural knowledge. We aim to answer *how propositional knowledge is constructed within the photographic apparatus by the embodied subject*.

The knowledge afforded by photographs is not confined to the passive reception of sensory information. Rather, photographs trigger embodied processes, which are dependent on previous personal experiences with photography. Therefore,

photographs afford not only knowledge about the world's appearances but also subjective information about the viewers themselves as well as their histories and cultural and social backgrounds. This prior knowledge is a tacit part of the photographic apparatus, both embodied and interpersonally shared.

Here, we examine the epistemological phenomena of photography relating to affect, which is accompanied by various embodied manifestations. As an example, we use the IAPS, which is a set of photographs that should evoke a standardised, normative emotional response in viewers.⁵⁰ The IAPS comprises 700 photographs that are rated according to three affective dimensions — valence, arousal and dominance — that are assumed to be the basis of individual emotions. For example, anger has negative valence, high arousal and high dominance, whereas depression has negative valence, low arousal and low dominance. The ratings for the photographs are acquired from multiple observers who viewed each photograph for six seconds and, immediately after the presentation of the photograph, rated their emotional experience according to those three dimensions.

The IAPS and its open-source counterpart OASIS provide a tool for studying, for instance, the neurophysiology of emotions.⁵¹ Presentation of a photographic image of this set should evoke a certain, predetermined emotion, which should then manifest in changes in electric and magnetic brain activity, skin conductance, heart rate and face muscles. This kind of mechanical reading of images, however, was problematised in the previous sections. The relation between the image and the body is not direct but is linked by a medium that has a distributed and interpersonal nature.

In the current theories of the predictive nature of perception, the information provided by the eye integrates information of our previous encounters with the world, distributed within the neural networks of the brain.⁵² This framework therefore has interesting parallels with Merleau-Ponty's notions about embodied 'sedimentation', by which he referred to the way our previous experiences guide our perceptions.⁵³ If someone looks at a forest that lies behind a field, they subjectively see dozens or even hundreds of individual trees. In reality, they have detailed information only about a couple of trees, depending on the distance; the rest is only greenish clutter.⁵⁴ Based on their previous encounters with similar scenes, their visual system predicts that the greenish clutter comprises dozens of trees, which have leaves, branches and trunks — a visual view that will most probably unfold when they move their gaze towards that direction.⁵⁵

In the case of photographs, human vision predicts the three-dimensional structure of a photographic scene from a flat surface. In Belting's words, 'our gaze tends to animate the photographic surface'.⁵⁶ We also *intuitively* know the difference between holiday snapshots, commercial photography and news photography without any explicit reasoning. This is something we cannot bracket from our experience. In fact, without the sedimentation of previous experiences, we would not see any photographic images at all; they would not make sense to us.

This predictive processing has several implications on the perception of photographic images. We expect the photographs to not only depict real, three-dimensional scenes but also be objects that exist for certain reasons. To

become understood, we also accommodate our habits to socially shared practices. When practices are shared, both the photographer and the viewer easily understand the meaning, even if the image itself is rather uninformative. Our embodied knowledge about the photographic apparatus activates predictions about the message that is embedded in the image, enabling mutual hermeneutic understanding in photographic communication in a similar manner as in verbal communication.⁵⁷ Within certain photographic practices, a form of visual language is created, making interpersonal communication easier.

This however makes photographs highly situated objects, as the prior knowledge is dependent on the historical and cultural context. Therefore, we easily see mobile phones and other present-day technology in historical photographs. It is claimed that the IAPS is universal enough in its ability to create the desired affect across cultures,⁵⁸ but both the IAPS and the OASIS have been criticised to be biased towards white audiences.⁵⁹ The collection of samples from the OASIS database shows the prevalence of western imagery that is present in standardised stimuli (Figure 4).⁶⁰

The developers of the IAPS acknowledge the special role of photographs as objects to some degree. Lang et al. suggested that the contents of photographs are emotionally treated similarly to real objects in the visual scene; however, the 'artistic frame of reference' prohibits us from conducting the usual behaviour that we would perform when facing similar objects in real life.⁶¹ This objectifying frame of reference may result from basic neural processes, as visual information in the human brain proceeds through two routes.⁶² The first is the ventral stream from the visual cortex towards the temporal lobe and is responsible for semantic analysis and conscious perception; the second stream from the visual cortex towards the parietal lobe and motor areas processes action affordances. The latter information is non-conscious and embodied yet available to us by recognition that we cannot touch the objects in the



Fig. 4. Photographs from the OASIS stimulus set, to evoke affect with positive valence and medium arousal.

photographic images, as it is a two-dimensional object. Owing to this pre-reflective experience of two-dimensionality, we notice the object-like nature of the photographic image and possibly reflect on the reasons for the existence of such an object. This emotionally distances us from the immediate content of the images.

The *awareness* of an artistic, photographic frame of reference adds a *meta-level* in the perception of photographic images, enabling the conscious reflection of the image as an object — its genre, style, function and context. This metacognitive processing allows people to monitor and control their own cognitive processes,⁶³ facilitating re-interpretation of the photographic content and the emotional responses it evokes. Our emotional response to a picture of a physically injured person, for instance, depends on whether we believe that the photograph is true or not. If we believe that the photograph is a fake, it should create in us different feelings than those created by photographs that we believe are genuine.

Metacognition allows us to spot the underlying situational, cultural and technological aspects and enables the viewer to consciously adjust their interpretation of the photographic images accordingly. To put it differently, reflection enables creation of propositional knowledge, conscious judgments about the image and epistemic thinking, which are required in, for instance, the detection of fake news.⁶⁴ For example, in the case of photographs in Fig. 4, a critical viewer can become aware of the practices that lead to biased representations, which ultimately may lead to different emotional responses contrary to the original intention.

The knowledge that a photograph affords results from processes that combine direct, sensory information with embodied, sedimented previous experiences. Reflection and propositional knowledge can, however, enable us to critically assess the stereotypical representations within the photographic apparatus. These processes yield the subjective experience of a photograph, an event that, in Belting's words, 'animates' the otherwise inanimate object.⁶⁵

Conclusion

Images are part and parcel of our reality, which is why we have chosen to reflect and theorise imaginability in pragmatic terms. Drawing from the anthropological framework established by Belting,⁶⁶ we suggest that the epistemic functions of photographic images are ontologically connected to photographic practices. Thus, investigating photographic epistemologies always implies a close analysis of the entire apparatus including its non-iconic determinants — namely, the medium and the bodies implicated. In other words, to fully understand how images operate, it is necessary to pay attention to the situations where human agents, discourses and technologies interact and condition each other. In the absence of practices, images do not make sense; there is nothing to see nor to imagine.

The study of knowledge related to photographic practices is challenged by the advent of new media that has introduced a plethora of interfaces where social interactions are facilitated by the camera phone, as discussed above in the section about Snapchat. New media constitute a prime example of entirely black-boxed

technologies. Although they are based on the medium of photography (and as such determined by the photographic apparatus), the smooth and seamless operation of these interfaces is susceptible to giving a false impression of unconditioned mediation. In attempting to identify both the social, operational and psychological aspects and the factors that constitute the photographic event, our multidisciplinary account intends to contribute to the research on new media with a more holistic understanding of the epistemic stakes in photographic mediation.

To answer the question of *how knowledge is constructed and transmitted within the photographic apparatus*, we have introduced illustrative examples of photographic practices, representative of three different disciplines. Furthermore, we have asked what kind of knowledge is produced and how the perceiving subject is intertwined in these practices. Through and with the selected examples, we have revisited Belting's⁶⁷ core idea of the image as an anthropological dispositive for producing, distributing and storing visual information. Images offer epistemic affordances for knowledge to manifest itself. In so doing, the photographic image works as a connective link or transitional epistemic object between subjective (individual) life-worlds and the (shared) physical and cultural realities of our natural and social world. Following Belting,⁶⁸ we have described how images become invested with meanings through 'animation', an embodied epistemic practice that allows the ideational to manifest itself and to be addressed in an informative and transmissible visual form. Hence, the photographic image offers both conceptual and experiential means for communication. The knowledge is constructed in this embodied process of 'animation' – that is, through social, technological and psychological entanglements within the photographic apparatus where information is produced, extracted and transmitted.

In addition to underlining the connective power of photography, our multidisciplinary approach has highlighted the role of *procedural knowledge* characteristic to all interactions within the photographic apparatus. Despite the terminological and methodological differences between our respective practices, procedural knowledge is at stake regardless of whether photographic mediation is examined through Snapchat, in critical studies of visual artworks or as a subjective cognitive experience.

The first section focused on the knowledge produced within current communicative practices. We argue that these practices entail photographic knowledge that is not primarily related to the representative iconic content but is rather induced by the photographic image. In previous literature, the indexical quality of the photographic image has been mainly addressed in photographic discourses of veracity and truthfulness. However, here we suggest that within current communicative practices, indexicality is epistemologically interesting specifically owing to the sense of presence it affords. This sense of presence has an important epistemic role in creating and maintaining *interpersonal knowledge* within current media practices, where the communicative partners often are not in the same physical space.

The second section studied the epistemic standing of imaging procedures. A photograph is not only an image *of* something but also a technologically conditioned epistemic object. Black-boxed by the smooth operation of the interfaces, the photographic medium is often regarded as transparent, which tends to obliterate from

epistemological discourses both the instruments and the human agents coping with the technologies. We offered insights into the technologically mediated images' *embodied, situated* disposition. Their hidden technological 'subface' can be studied by analysing *the chain of imaging* and by identifying the concrete factors and agents that constitute the image event.

The third section discussed the embodied part of the apparatus and the nature of the procedural *a priori* knowledge embedded in it. We differentiated it from the propositional knowledge, which we redefined as a form of metacognition. The former manifests not only in measurable emotional response and subjective experience but also when individuals habitually follow the socially shared practices. Metacognition enables reflective thinking and thus epistemic reasoning. It can further moderate the way photographic images are experienced and how their subjective veracity is judged.

To conclude, we have stressed the significance of photographic practices in knowledge construction. Instead of attempting to pursue the veracity of the photographic image by judging its truthfulness based on iconic or indexical functions, we have referred to the circumstantial elements of 'body and medium' that constitute the epistemic stakes of the image and condition the photographic 'event'. The knowledge mediated by photographic images is implicit in their conception, reception and pictorial becoming and therefore it cannot be abstracted from the social practices, technical operations, or human agencies involved. It does not lie outside the image as isolated content or a referent to grasp but is instead constructed through and embedded within the social, technological and psychological processes of photographic mediation.

Our examples have illustrated how photographic images work as links between the sensory and ideational processes of knowing and thereby mediate between the subjective life-worlds and our shared cultural realities. Thus, the knowledge situated within the photographic apparatus often appears as *procedural knowledge*. We suggest that recognising this *connective function* is paramount to fully understand the implications of photographic images in current visual media cultures.

Notes

1. See e.g. Cadava, *Words of Light*; Crary, *Techniques of the Observer*; Gombrich, *The Image and the Eye*; Kofman, *Camera Obscura*; Lalvani, "Photography, Epistemology and the Body"; Sekula, "The Body and the Archive"; Seppänen and Herkman, "Aporetic Apparatus"; Seppänen, "Unruly Representation"; Snyder, "Res Ipsa Loquitur"; and Tagg, *The Burden of Representation*.
2. In the field of German *Bildwissenschaft*, the "image science," see e.g. Krämer and Bredekamp, "Culture, Technology, Cultural Techniques," 20–29; Weigel, *Grammatologie der Bilder*; Elkins, *Photography Theory*; and Mitchell, *Image Science*.
3. Belting, "Image, Medium, Body."
4. Ibid.
5. Ibid.
6. Ibid., 302–3.

7. Ibid., 302.
8. Ibid.
9. Samarajiva, "International in Scope and Interdisciplinary in Approach," 12.
10. Benton, "Epistemology Personalized," 813.
11. Niemelä-Nyrhinen and Seppänen, "Visual Communion."
12. Barthes, *Camera Lucida*.
13. Peirce, *Collected Papers*; and Dubois, "Trace-Image to Fiction-Image," 157–8.
14. Barthes, *Camera Lucida*, 76.
15. Ibid., 77.
16. Peirce, *Collected Papers*.
17. See e.g. Krauss, "Notes on the Index," 63.
18. Elkins, *Photography Theory*; Lehmuskallio and Gómez Cruz, "Why Material Visual Practices?"; Murray, "Digital Images, Photo-Sharing and Our Shifting Notions of Everyday Aesthetics," 157; Rubinstein and Sluis, "The Digital Image in Photographic Culture"; and Seppänen, "Unruly Representation".
19. Niemelä-Nyrhinen and Seppänen, "Visual Communion," 1051.
20. Peirce, *Collected Papers*; and Barthes, *Camera Lucida*.
21. Benton, "Epistemology Personalized," 826; and Niemelä-Nyrhinen and Seppänen, "Visual Communion," 1054.
22. Benton, "Epistemology Personalized," 814.
23. Ibid., 822, 826.
24. Cf. Belting, "Image, Medium, Body," 302–3.
25. Niemelä-Nyrhinen and Seppänen, "Photography as Play," 590.
26. See note 11 above.
27. Laver, "Communicative Functions of Phatic Communion"; Malinowski, "The Problem of Meaning"; and Senft, "Phatic Communion."
28. Frosh, "Phatic morality: Television and proper distance," 385–6.
29. Green and Lowry, "From Presence to the Performative."
30. Niemelä-Nyrhinen and Seppänen, "Photography as Play."
31. Niemelä-Nyrhinen and Seppänen, "Visual Communion," 1053.
32. Photographs in Image 1 correspond to typical photographs sent through Snapchat (Niemelä-Nyrhinen & Seppänen, "Photography as Play") and are reconstructed for the purposes of this article.
33. Cf. Boden and Molotch, "The Compulsion of Proximity," 258; and Laver, "Communicative Functions of Phatic Communion," 236.
34. See note 3 above.
35. Crary, *Techniques of the Observer*; Ihde, "'Cartesianism' Redux or Situated Knowledges"; and Ihde and Selinger, "Merleau-Ponty and Epistemology Engines".
36. Osborne, *The Postconceptual Condition*, 135–45
37. Latour, *Pandora's Hope*, 70–74.
38. Belting, "Image, Medium, Body," 305.
39. Ihde and Selinger, "Merleau-Ponty and Epistemology Engines," 366.
40. Flusser, *Towards a Philosophy of Photography*, 26.
41. Närhinen, *Kuvatiede ja luonnontaide*.
42. Ibid., 108–9.
43. Ibid., 26–35.
44. Elo, "Photographic Apparatus."

45. Ibid., 357–8.
46. Ibid., 357.
47. Wortmann, *Authentisches Bild*, 155–7.
48. Galison, “Images Scatter into Data,” 322.
49. Gupta and Cohen, “Theoretical and Computational Analysis of Skill Learning, Repetition Priming, and Procedural Memory.”
50. Lang, Greenwald and Hamm, “Looking at Pictures.”
51. Kurdi et al. “Introducing the Open Affective Standardized Image Set (OASIS).”
52. Clark, “Whatever Next?”
53. Merleau-Ponty, *Phenomenology of Perception*, 149–50.
54. Cohen et al., “What is the Bandwidth of Perceptual Experience?”
55. Clark, “Whatever Next?”
56. Belting, “Image, Medium, Body,” 307.
57. See Friston and Frith, “Active Inference, Communication and Hermeneutics.”
58. Hampton et al., “Variations in the regulation of affective neural responses across three cultures.”
59. Carbajal et al., “Critical cognitive science.”
60. See note 51 above.
61. Lang et al., “Looking at Pictures.”
62. Nanay, “Perceiving Pictures.”
63. Nelson, “Consciousness and Metacognition.”
64. Leisti and Häkkinen, “The Effect of Introspection on Judgment and Decision Making is Dependent on the Quality of Conscious Thinking”; Evans and Stanovich, “Dual-Process Theories of Higher Cognition”, and Pennycook and Rand, “Lazy, Not Biased.”
65. Belting, “Image, Medium, Body,” 307.
66. Ibid.
67. Ibid.
68. Ibid.

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