Momentary Symbols: Tracing the Visual Expressions of Collectives*

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Abstract: While a growing sociological literature documents how visuality shapes collective identities, less attention is given to the temporal dimension of symbol construction and the shifting meanings and practices associated with prominent images and objects. We introduce the concept of momentary symbols to describe and examine processes where objects for a shorter period rapidly grow into a dominant symbol for a collective, but just as quickly acquire a less central symbolic role. We demonstrate the empirical relevance of this concept by tracing how umbrellas, lasers, and masks became central but temporally contingent visual symbols of Hong Kong's protest movement, *Anti-ELAB*. Specifically, we use methods from computational sociology (including dictionary classification, object detection, and actor-network visualisations) and tweets about the 2019 Hong Kong protests (N = 1,615,832) to trace the provisional and unstable characteristics of Anti-ELAB's visual expressions. Drawing on actor-network theory, we analyse objects and technologies as non-human actants that express protest and oppositional voices alongside humans. Results show that the three actants (umbrellas, lasers, and masks) oscillate between symbolic-visual and practical-confrontative translations during the protest period. Our study demonstrates the relevance of using processual and temporal approaches to capture the erratic and volatile nature of symbol construction processes.

Keywords: actor-network theory, interaction ritual chains, symbols, visuality, digital protest

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Introduction

The largest demonstration in Hong Kong's history took place on 16 June 2019. Approximately two million residents took to the streets to show their dissatisfaction with a draft law enabling the Hong Kong government to extradite crime suspects for prosecution in China's judicial system. Starting as a backlash to the extradition bill, the 2019 demonstrations would later evolve into a general opposition against China's involvement in Hong Kong and eventually a broader call for democracy. Meanwhile, the protest movement behind the demonstrations, known as Anti-ELAB (Anti Extradition Law Amendment Bill), became infamous for using umbrellas, laser pointers, and masks in collisions with the local authorities (CNA, 2019). In this paper, we trace how umbrellas, lasers, and masks became key visual symbols of the Anti-ELAB movement, with a specific emphasis on the shifting meanings and practices associated with these objects throughout the protest period. These objects were both tools of confrontation and symbols of identity, and their meanings shifted throughout the protest timeline. The Anti-ELAB protests therefore provide an ideal setting to observe the temporal and processual dynamics of symbol construction in digitally mediated protests.

A growing sociological literature examines the visual expressions of protests through symbols and images with a focus on embodied practices of protest (Doerr et al., 2015; Kwok, 2021; Mattoni and Teune, 2014; Neumayer and Rossi, 2018; Olesen, 2011; Pang, 2021). While this literature offers valuable insights into how visuality shapes collective identities and emotions, less attention is given to processes of symbol construction and the shifting meanings and practices associated with prominent images and objects as collectives evolve. However, grasping the temporal dimension is key to understanding how collectives mobilize. In this article, we introduce the concept of *momentary symbols* to describe and examine processes where objects for a shorter period rapidly grow into a dominant symbol for a collective, but just as quickly acquire a less central symbolic role.

The Anti-ELAB movement represents a rich case for studying such processes, as a series of objects (umbrellas, lasers, and masks) momentarily assumed symbolic status during the protest activities in Hong Kong. We use methods from computational sociology (including dictionary classification, object detection, and actor-network visualisations) and 1.6 million tweets about the 2019 Hong Kong protests, to trace the provisional and unstable characteristics of the Anti-ELAB movement's visual representations of symbols to a global audience.

We apply a specific actor-network theory (ANT)-based focus on translation processes. That is, we follow the non-human actants (umbrellas, lasers, and masks), describing their situational and dynamic character as they oscillate between practical-confrontational translations (e.g. as strategic weapons or shields in collisions with authorities) and more symbolic-visual translations (e.g. as symbols that visualise collective identity and resistance) during the Hong Kong protests. We assume that the protesters' translations of the actants are temporally contingent on concurring events at a short-term level, leading to some objects becoming *momentary symbols*, i.e., ephemerally dominant symbols that quickly change meaning.

Our study adds to scholarship on visuality by demonstrating the relevance of processual and temporal approaches to capture the erratic and volatile nature of collectives' visual expressions. Further, we add to the on-going debate on online interaction ritual chains (DiMaggio et al., 2018) with an analytical framework that allows quantifying processes of symbol construction and the temporal dimension of symbols. While this paper engages several literatures, its primary theoretical contribution is to develop the concept of *momentary symbols* as a way to understand the temporal dynamics of symbol construction in digitally mediated protest movements. We demonstrate the empirical relevance of the concept by combining ANT-inspired analysis with quali-quant image and text data.

Background

A growing literature examines the visual and symbolic aspects of collectives' communicative efforts (Doerr 2010, Doerr et al. 2013a, 2013b, 2015a, 2015b; Awad et al., 2022; Neumayer and Rossi, 2018; Olesen, 2011). Doerr et al. (2013) define visuality as a key component of protest movements that influences both how they are perceived by the outside world and how they act on conscious and subconscious levels. Visual sociologists highlight the open, ambivalent, and polyvalent quality of visual communication. A single visual symbol of protest can convey different and contrasting political meanings to different audiences simultaneously, making images susceptible to political conflict (Doerr, 2010; Olesen, 2005). Protesters often rely on a repertoire of narratives and symbols that were previously used by other movements (Doerr et al., 2013), which contributes to their formation as collective actors. In this process of organizing, visual expressions play a central role, as continuity is maintained through symbols, colours, slogans, logos, and other such elements.

While visual sociology literature offers rich insights into collectives' use of symbols, and prior studies have explored how visual images serve as communicative tools or symbols of dissent in protests (Awad, 2016, 2020; Doerr, 2010, 2017; Ikegami, 2005; Milman and Doerr, 2023; Neumayer and Rossi, 2018; Rossi et al., 2022; Schober, 2019), limited attention has been given to the temporal contingencies of visual expressions and symbols. Focusing on the temporal contingencies and construction of symbols is essential if the goal is to understand *how* and *why* some visual objects and technologies emerge as symbols in collectives. Hence, drawing on ANT and interaction ritual theory, we outline an analytical framework that allows us to investigate such processes over time.

Actants and chains of translation

To understand how visual objects obtain and lose symbolic roles in digital protest, we draw on early actor-network theory (ANT), and analyse objects and technologies as non-human *actants* (Callon and Latour, 1981; Latour, 1993). According to this view, the act of protesting is not exclusive to humans but can also be carried out by, for example, umbrellas that counteract surveillance or express collective identity. Further, with the concept of translation, we highlight that actants do not possess a singular identity or predefined essence independent of the social situation. Instead, the role of the actant depends on the network of other actants with which it is associated and thereby translated. The concept of chains of translations highlights the dynamic nature of this process, whereby the translation of an actant can evolve over time, resulting in a chain of temporarily fixed translations. ANT provides a useful vocabulary for describing such chains (Latour, 1990). The concept of 'translation' (Callon, 1984, 1990; Callon and Latour, 1981; Latour, 1999) helps us understand how actants, whether human or non-human, are enrolled and transformed through networks of association. Figure 1 illustrates our line of thinking. When a laser is enrolled in a network that involves, among others, adversaries such as surveillance cameras and policemen, we can interpret its translation to be confrontational. On the other hand, when it is enrolled in a network with many human protesters, and in the absence of adversaries, it is transformed into a symbol.

Figure 1

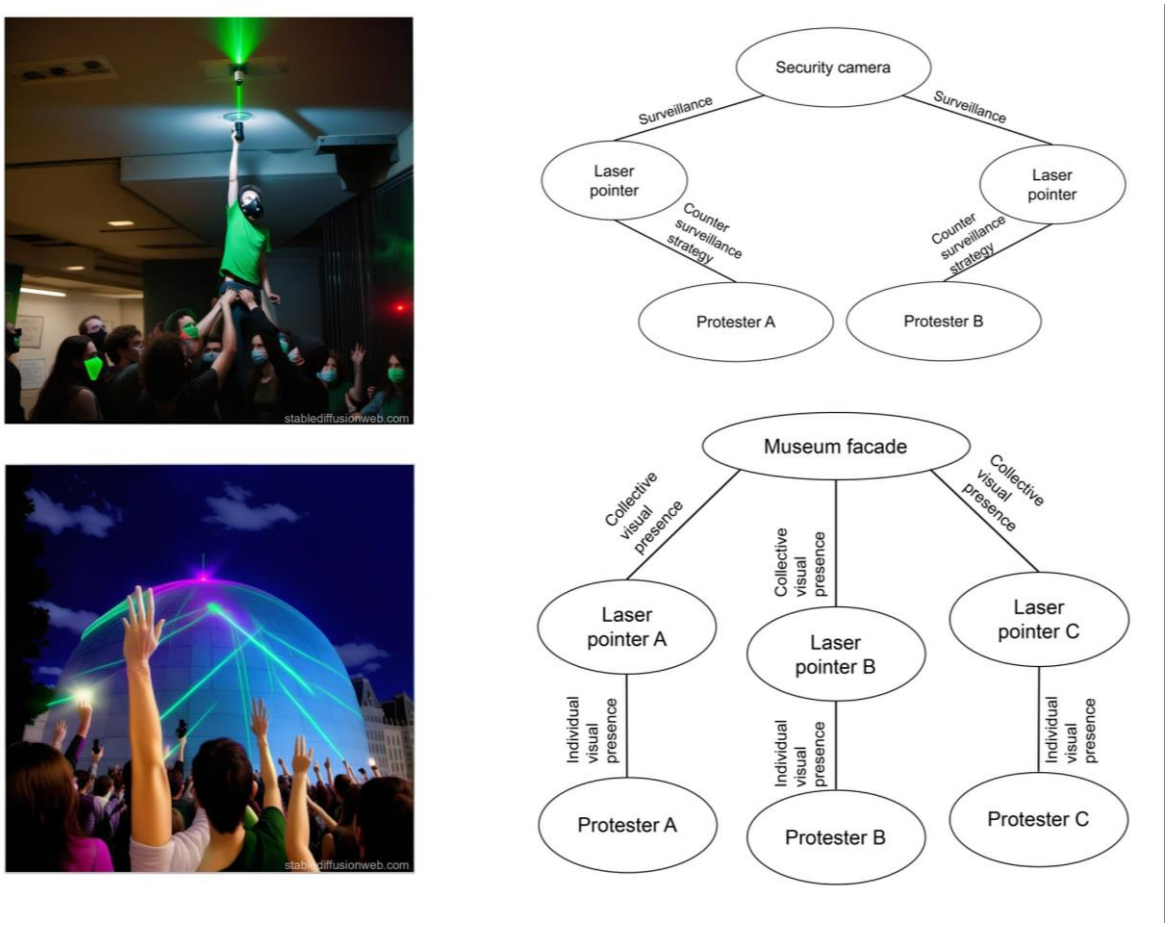

Fig. 1. On the upper left, a generative AI recreation (Stable Diffusion) of an actual image from the protests in Hong Kong containing a laser. On the upper right, we draw an actor-network surrounding the laser actant (containing a sub-set of the laser actor-network). First, we identify the actants that are connected to the laser: protesters and the security camera. We then interpret the translations that the laser actant obtains from its associations. For the protester, the laser functions as a practical tool to combat the gaze from the surveillance camera, i.e., it is mobilized as a practical-confrontational actant (Johansen et al., 2019). In the bottom left generative AI recreation, the process is repeated. In this situation, the network suggests that the laser is translated into a symbolic-visual actant that visualises a collective we-identity through a joint focus of attention (Collins, 2005). Instead of this manual approach to outlining the actants' translations through their associations in networks, we develop and use a computer-assisted framework that builds on both text and images.

With this approach, movements are examined temporally as forms of organizing rather than as static entities (Law, 1994). Thus, sharing images of umbrellas, slogans and gas masks on Twitter becomes an asset in the creation of the Anti-ELAB movement, rather than something that follows the establishment of the movement. While classic ANT studies often foreground thick, qualitative descriptions of specific actants and their negotiations, our aim here is different: we trace

the movement and reconfiguration of actants across chains of translation using a quali-quantitative approach. This enables us to extend ANT's relational lens to large-scale digital data, capturing patterns of translation that emerge not only through localized actor strategies, but across a broader temporal and communicative scope for the collective.

Symbol construction within interaction rituals

Our understanding of the symbol construction processes that collectives enact is grounded in Randall Collins' theory on interaction ritual chains (Collins, 2005). Collins argues that symbols are outcomes of interaction rituals, which are situations where a collective shares a joint focus of attention and experiences emotional energy through collective effervescence (Liebst, 2019). Through the joint attention toward, for example, objects, words, or images, a collective we-identity arises (Flam and Doerr, 2015; Polletta and Jasper, 2001), as interaction ritual participants imitate each other's practices and expressions. Further, symbols are shaped by the barriers and boundaries that separate groups through contrasts and conflicts. One example of an interaction ritual is the Anti-ELAB assembly at the Hong Kong Space Museum, where a large collective of protesters imitated each other's expressions by pointing lasers toward the museum's façade (Figure 1). By doing so, they collectively demonstrated their presence and solidarity, turning the laser into a symbol through joint attention and emotional energy. This allowed the collective to prolong its effervescence by 'storing' the energy in the laser as a symbol (Collins, 2005:81). Collins was initially skeptical about whether interaction ritual can generate effervescence online. However, newer work indicates this can be the case (DiMaggio et al., 2018).

While all symbols depend on interaction rituals to form, not all symbols endure. What we emphasise in this paper is that the collective rituals of digital communication tend to be shorter in duration, more reactive, and more rapidly superseded by new events. Symbols produced in online interaction rituals are therefore inherently context-dependent and *momentary*: emerging and fading

in close alignment with fleeting events and bursts of collective attention. Thus, while symbol construction always relies on meaning-making in context, the duration and volatility of contemporary symbols in the digital realm are specific. Momentariness, in our usage, is therefore an analytical distinction that captures the increasing instability of symbol construction in fast-moving digital environments. We extend previous research on online interaction rituals by providing an analytical framework that enables researchers to use social media data to (i) identify interaction ritual with joint attention toward objects, (ii) map out changes in the objects' translations through actor-networks, and (iii) assess the temporal longevity of symbols that result from the interaction rituals.

Towards a theory of momentary symbols

Sociologists have focused on how new protest movements draw on rich repertoires of visuals and symbols from previous ones (Doerr, 2010; Milman and Doerr, 2023). However, digital media logics introduce an accelerated temporality, where collectives encounter bursts of attention that quickly subside in favor of new issues (Lorenz-Spreen et al., 2019). This change in attention-spans influences the symbol construction process, as the interaction rituals may be intensive in strength but experience quick decay in attention, suggesting that the 'storing' of collective effervescence in the symbol is only momentary (Collins, 2005). Collectives therefore need to engage in new interaction rituals and produce new symbols to uphold the collective effervescence, visual representation in media, and we-identity required to mobilise and survive. For this reason, collectives would need to react swiftly and strongly to emerging events and incidents, as these are ample opportunities for spawning interaction rituals, constructing symbols, and attracting attention from the outside world through visual expressions. Thus, collectives' symbol construction resembles temporarily contingent chains of momentary fixations of symbols, that may be quickly substituted in the next link of the chain. While all symbols are contingent on context and meaning-

making, our focus is on the growing prevalence of symbols that achieve prominence only briefly, often replaced or retranslated within days or weeks. This volatility marks a distinct symbolic dynamic that is under-theorized.

We therefore argue that there is a need for deepening the current conceptualization of collective symbols and visuals, moving from perceiving symbols as atemporal and stable entities to understanding them as fluid, highly dynamic, and volatile constructs that often obtain only momentary status as a dominant symbol (Askanius, 2013). By this, we do not mean that symbols cannot become enduring and long-lasting. However, tracing how collectives construct symbols – both those that are momentary and those that endure – provides an opportunity to obtain saturated knowledge on their we-identity, the issues they target, and their developments over time. We therefore need to develop a theory that accommodates temporality and process in its conceptualization of symbols to better grasp contemporary collectives that communicate in the digital realm. Our notion of momentary symbols is a step in this direction.

Momentary symbols are defined by three traits. First, momentary symbols are *temporally contingent*, meaning that they are highly bound to time, as they are constructed in relation to concurrent events and issues. Without these events, the interaction rituals that translated the specific actants into symbols would not have been spurred, leading to a different symbol construction process. Second, momentary symbols are *volatile*, due to the speed and acceleration that characterise contemporary digital communication. The outcome of this trait is that the translation of momentary symbols may swiftly change as the collective reacts to new events and issues, in turn abandoning the previous symbol. Finally, momentary symbols involve a *visual* dimension. With this, we mean that actants are translated into momentary symbols in a distinctly visual manner. The visual dimension helps the collective to grab the attention that the new event generates, exploiting the power of images in a digital world of information abundance.

Our concept of momentary symbols builds on Umberto Eco's semiotic theory in which symbols are seen as inherently unstable (Eco, 1986). However, we emphasise a distinct temporal acceleration in the symbolic life cycle, where objects achieve intense but short-lived symbolic status in response to fast-paced events and the heightened visibility afforded by digital media. Rather than seeing symbols as evolving yet relatively enduring within social contexts, momentary symbols capture how certain objects swiftly gain and lose symbolic prominence in response to concurrent events and the accelerated rhythms of digital communication.

In summary, we integrate perspectives from visual sociology, interaction ritual theory, and ANT to capture the temporal contingency of collective symbols. Our study offers a novel perspective on how symbols evolve and acquire new meanings as they move through networks of association, exemplified through the 2019 Anti-ELAB protests in Hong Kong.

Research design

In this article, we analyse scraped tweets about the Hong Kong protests and evaluate the translations of three actants (umbrellas, lasers, and masks) on the media platform throughout the protest period to show the empirical relevance of momentary symbols. We adopt a mixed methods approach oscillating between qualitative and quantitative modes of analysis of social media data (Blok et al., 2022). This approach allows us to 'test' our interpretations across domains (Nelson, 2021), i.e., testing whether interpretations based on quantitative results can be validated through qualitative insights and vice versa. Drawing on Robert Kozinets' framework for netnography (2019), as well as the five principles for doing digital ethnography (Pink et al., 2016), we acknowledge, for example, the importance of maintaining openness and 'non-digital-centric-ness' during our qualitative immersion into tweets, and being reflexive about our influence on the analysis, to better capture the fluid and temporally contingent nature of symbols.

Data

We used the official Twitter API to scrape tweets that mentioned Hong Kong-related hashtags during the protest period. We collected relevant hashtags through qualitative immersion into protest-related tweets during different periods of the protests and identifying novel words and hashtag usage (Kozinets, 2019) (see Supplementary Material A). Concretely, a snowballing strategy was used to collect a list of hashtags used in encountered tweets. Only hashtags used in over 40,000 tweets were included in the final list to avoid capturing niche discussions that do not reflect the broader movement's tweets. As we aimed to map the actants' temporal developments on Twitter during the protests, we limited the time period to the day before the first intentions of the extradition law bill were made publicly known, 11 February 2019, until the end of the year, 31 December 2019, after which the intensity in protests decreased (AFP, 2020), and to remain within bounds of API limits. After cleaning the data and removing duplicates and spambots (see Supplementary Material B for details on this process), our empirical foundation for the project consists of 1,615,832 tweets and 671,164 tweet images. It should be noted that the tweets included in our dataset are not solely from protesters, but also cover tweets from anti-protest actors, journalists, news media, and online spectators. To ensure the anonymity of individual protesters, whenever example tweets are presented, usernames and timestamps are removed.

Importantly, local Hong Kong protesters mainly used platforms other than Twitter to organise and communicate, e.g., the communication platform Telegram or the Hong Kong-based LIHKG Forum, where protesters coordinated protests in Cantonese. With our Twitter data, we therefore primarily capture how Anti-ELAB presents itself to a global audience via a multilingual medium to attract attention to its issues (Olesen, 2005, 2011, 2015). While this outward-facing orientation limits our ability to observe protesters' internal meaning-making processes, we treat Twitter as a valuable trace of how symbols are publicly described, translated, and circulated. Thus, our analysis captures symbol construction as it becomes visible and contested in the digital sphere.

Methods

To map the temporal developments of the actants' translations, we use dictionary classification, object detection, and semantic ego network snapshots. Dictionary classification is used to estimate the textual prevalence of the actants in the data. This process involved creating lists of words that are commonly used in relation to each actant (Wiedemann, 2019). These lists were generated using the similarity function of the Word2Vec algorithm, which calculates vectors between all words in the dataset (Mikolov et al., 2013). This allows for the identification of words that are semantically related to each actant, and for the addition of new words to the lists as necessary (Evans and Aceves, 2016). To refine the dictionary model, we manually assessed a sample of tweets that had been classified as being about a particular actant (Nelson, 2017). If the model's classifications were imprecise, words were removed from the actant's list (see Supplementary Material C for more details). This process was repeated until the model's estimations were sufficiently precise, i.e., above a threshold of 70 percent accuracy. Supplementary Table 1 shows the number of tweets per actant as classified by the constructed dictionaries. With the classifier, we can graph each actant's activity in tweets over time. This is used to identify peaks in activity for the actant, after which we segment the protest period into multiple time periods for each actant, allowing for temporal analysis.

Symbol mobilization is a practice that heavily relies on visual elements. To account for this aspect in our data analysis, we utilise a deep learning-based object identifier. Specifically, we employ YOLOv4 (Redmon and Farhadi, 2018) to estimate the prevalence of one crucial element in the mobilization, namely the umbrella, within approximately 700,000 images in our dataset. We do not analyse GIFs and videos due to limited computational resources. Unfortunately, YOLOv4's object detection performed poorly for masks and lasers, due to the varying shapes and forms of laser beams in images and the diverse types of masks used in the protests. Therefore, we only

present the results of umbrella detection. Furthermore, current computer vision techniques do not allow for classifications of different translations of the actants. Future advancements may enable such analyses. The YOLOv4 model achieved an F1-score of 0.60 (for more details on object detection performance, please refer to Supplementary Material D). While this is reasonable for in-the-wild protest images, it introduces uncertainty regarding exact umbrella counts. We therefore use detection trends in a comparative, not absolute, sense.

There are two significant advantages to incorporating data from image-based object detection in our analysis. First, even if umbrella-related terms are infrequently used in tweets, the object may still be prevalent in images. Second, object detection provides valuable insights into the translation of umbrellas over time. By extracting images with varying numbers of umbrellas, we can qualitatively interpret their translations during different periods.

To trace how actants are translated over time in digital protest communication, we employ actor-network visualisations based on co-word analysis (Callon et al., 1983). These translation snapshots represent the temporally shifting associations that help define the symbolic role of actants in protest discourse. While our visualisations resemble those used in social network analysis, our analytical aim is different. We draw on Callon et al.'s (1983) method of co-word analysis to trace the shifting semantic associations around focal actants over time. In this actor-network perspective, the goal is not to measure structural properties of a network per se, but to examine how actants are translated through changes in associations (Callon et al., 1983). In co-word network analysis, words are considered inscriptions that mediate the translations of actants and establish relationships (Callon et al., 1983). By temporarily fixing the translations of other actants, actants in the network create chains of translation that evolve over time. We assume that the co-occurrence of keywords reflects the contents of a document, and in our case, documents take the form of tweets, with keywords being nouns related to selected actants. We use the ForceAtlas2

algorithm to visualise actor-networks for each non-human actant and analyse their immediate relationships in line with actor-network analysis. To support explorative analysis and interpretation of the role of actants in the networks, the size of nodes is based on their degree score, which is the number of times a node connects to other nodes in the network. We use Gephi's modularity algorithm to assess clustering in the network (Blondel et al., 2008), as it can assist in identifying multiple translations that exist simultaneously. We visualise clustering through the colourisation of nodes (Blondel et al., 2008). To capture potential changes in translations over time, we manually construct actant-specific time periods by identifying peaks and valleys of activity for each actant, including one peak per time period. Actor-networks are constructed for each of these periods of the actant, functioning as 'translation snapshots' representative of that period in time. These snapshots allow us to analyse the evolution of actants over time: specifically, their chains of translation. It should be noted that some words will be constant across snapshots, due to a shared context and vocabulary over time. However, we focus on the words that are substituted to infer shifts in the actants' translations, and present only translation snapshots for the time periods in which we observe such shifts. With this approach, we can robustly and systematically analyse the temporal dynamics of the actants at a general level without the risk of overclaiming based on qualitative analysis of selected events. However, this approach also has a drawback: it loses the depth and context of shifts in translations. Therefore, we triangulate the digital analysis with qualitative examples and inquiry (Blok et al., 2022). Qualitative work was carried out both before, through immersion into tweets (Kozinets, 2019), and after the production of quantitative results, where samples were drawn from our data to provide qualitative context, interpretation, and examples. As the success of the dictionary-based method hinges on alignment between chosen words and how words are used in a particular context, the former was useful in obtaining this insight. The intention with the latter was to qualify our interpretation and ensure knowledge about the objects of analysis. Samples were

randomly drawn from the actant-related datasets, conditioned on the co-occurrence of the words of interest. For the object detection analysis, samples were drawn randomly, but conditioned on time spans. We do not draw random samples from the entire dataset, as the likelihood of encountering tweets related to the actants of interest would be very low due to the relatively low fraction of actant-related tweets in the data. While this approach does enable the risk of confirmation bias, it was a necessity in this instance. To mitigate this, however, if translation snapshots indicated unexpected associations between actants, a sample with those word pairs was randomly extracted to challenge our existing interpretations and potentially reconfigure them.

Our combination of natural language processing and visual analysis in a quali-quant framework (Blok et al., 2022) grants us with a robust computer-assisted approach (Carlsen and Ralund, 2022) to the analysis of symbol construction, as 1) it allows for triangulation across data types, i.e., assessing ambiguity between translation in textual descriptions and in images, 2) it facilitates discovery of context-relevant categories through qualitative immersion to be used for quantitative operationalization, and 3) it enables us to identify points in time where translations shifted, allowing for a granular temporal dimension that qualitative immersion alone may not have granted.

Analysis

In this section, we trace the Anti-ELAB movement's symbol construction with a specific emphasis on processes of contestation and competition between actants. We describe the trajectory of each actant chronologically according to when it was dominant as a symbol of the Anti-ELAB movement, beginning with the umbrella. Through our analysis, we show how actants oscillate between two types of translations: (i) a practical-confrontational translation, where actants take on a practical function (e.g., to combat authorities or surveillance) and (ii) a symbolic-visual translation, where actants function as symbols of the protest movement without a distinct practical purpose.

These oscillations are not just semantic shifts; they unfold through the interventions of protesters, police, and the objects themselves, each carrying agency by enabling some actions and foreclosing others.

Figure 2

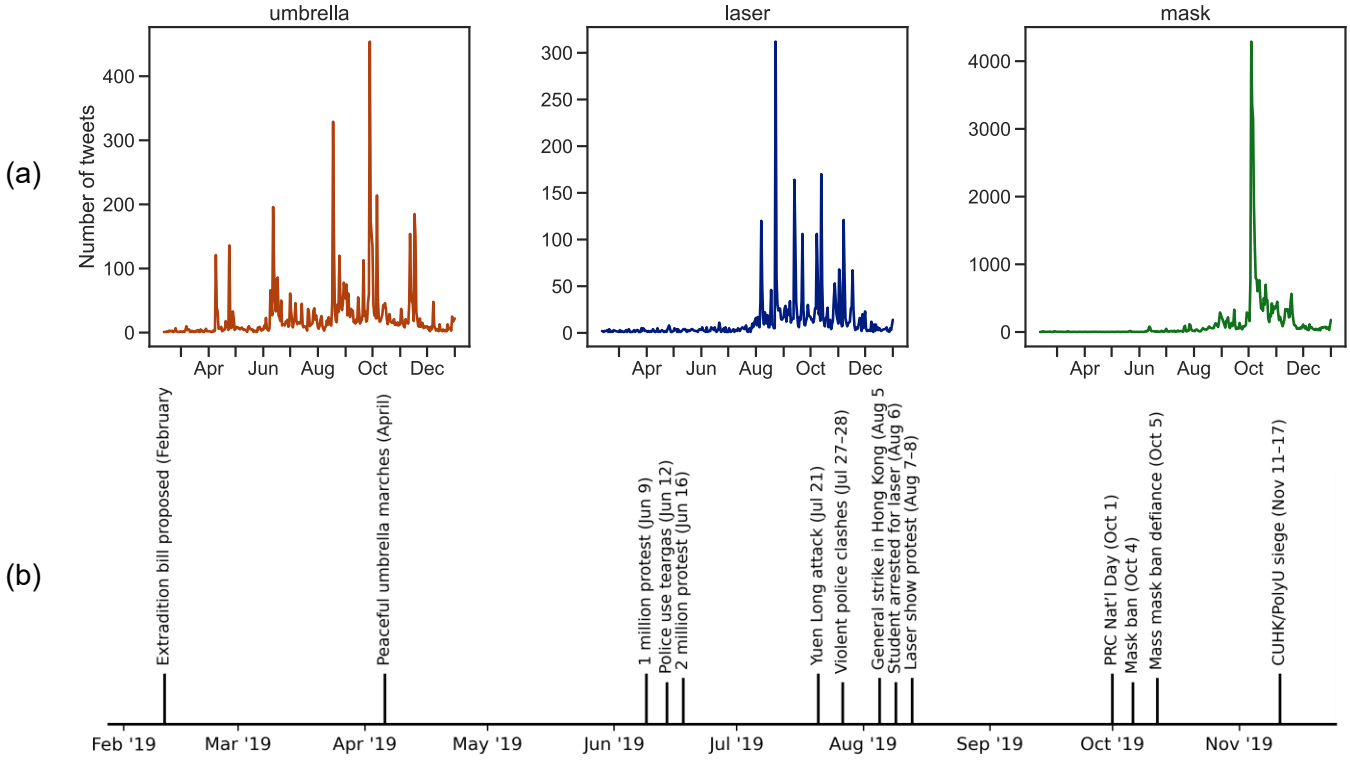

Fig. 2. (a) The daily mentions of umbrellas (left), lasers (middle) and masks (right) in 2019 in tweets on the Hong Kong protests. Plots are based on constructed dictionaries containing words describing each actant. (b) Timeline of events during the 2019 Anti-ELAB protests (see Supplementary Material E for timeline details and sources).

Figure 2 displays the temporal development of the three actants. Each actant has distinct peaks in tweet activity, indicating points in time, where it is more associated in the protest network. Given that translations are most likely to occur during periods of high activity due to the many associations (Callon and Latour, 1981) and increased joint attention towards the actants (Collins, 2005), we segment the protest period into sub-periods according to these peaks (see Supplementary Material E for defined time periods and event timeline).

Before zooming in on individual actants, we conduct an audience analysis to investigate if tweets that mention actants receive more engagement than non-actant tweets. We measure engagement based on likes, retweets, user followers, and image associations. We include image associations (i.e., tweets that include an image), as these may indicate a visual focus in the tweets. As shown in Figure 3, tweets that mention actants spur substantially higher engagement than other tweets, indicating that the actants are given a somewhat important role in the Anti-ELAB movement's Twitter activities (see Supplementary Material F for statistical tests).

Figure 3

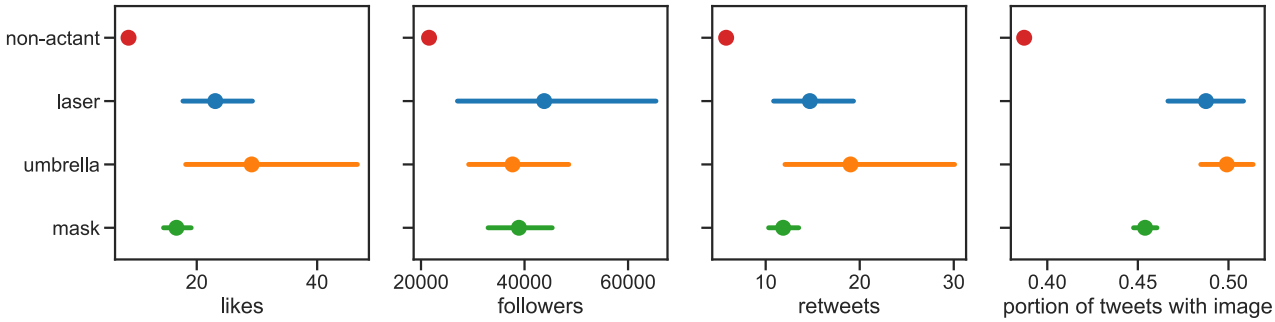

Fig. 3. Forest plots with mean likes, followers, retweets and image associations for non-actant and actant samples. Error bars indicate 99% confidence intervals drawn from 10.000 bootstrap samples. Z-tests ($p<0.000$) and Mann-Whitney U-tests ($p<0.000$) confirm statistically significant higher means and medians on all parameters for actant tweets compared to non-actant tweets (for details see Supplementary Material F).

Umbrella

During the Hong Kong protests in 2014, protesters primarily used umbrellas to symbolise peaceful, civil disobedience, e.g., through marches. In line with the argument that protesters 'borrow' from the repertoire of other movements (Wang et al., 2019), the protests at the beginning of the uprising in 2019 also used umbrellas as a symbol during marches. However, later in 2019, umbrellas were no longer just a symbol of peaceful disobedience, but also a practical tool of resistance in the collisions between protesters and police forces. For instance, protesters used umbrellas to shield themselves from teargas canisters and baton beatings, and to avoid being recognized by surveillance cameras (Doerr, 2010). By physically blocking tear-gas canisters and surveillance cameras, the

umbrella does more than carry meaning; it actively shapes the field of action, illustrating that material objects *do* things in the network.

In Figure 4, we use object detection to trace developments over time in the occurrence of umbrellas in images associated with Hong Kong tweets. According to the YOLOv4 algorithm, the visual prevalence of umbrellas is remarkably higher than their textual prevalence, with 5.8 percent of all images containing umbrella(s).

Figure 4

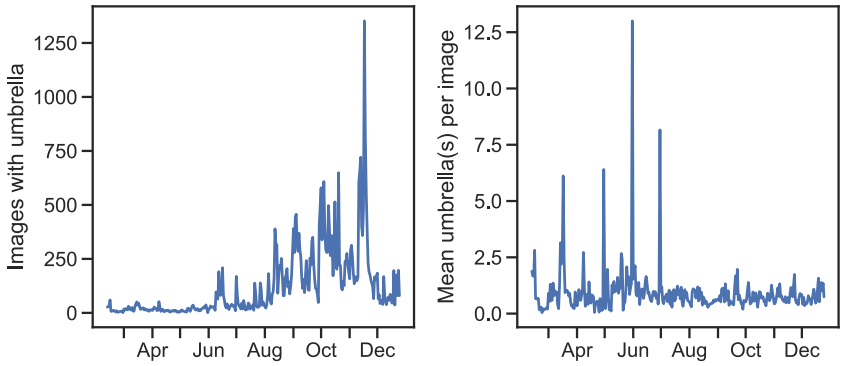

Fig. 4. Daily counts of images containing umbrella(s) (left) (n=37,005) and mean umbrellas per image per day (right) (N=671,164). YOLOv4 object detector used to identify umbrellas in images. Only umbrella detections with confidence scores above 0.5 are counted as a match.

As shown in the figure, the prevalence of umbrella images, despite continuous protests being sparked on the ground, fluctuates throughout the period, with distinct peaks along the way. To give a sense of this variation, we present an image from early marches in the beginning of the protest period (6 April), where images had a high umbrella density, and an image from the final stages of the protest period (17 November) during sieges of universities in Hong Kong (Figure 5), where there were more images of umbrellas, but fewer umbrellas in each image.

Figure 5

Fig. 5. Two images from the dataset containing umbrella(s). The left image is from 6 April 2019 and shows protesters marching while holding umbrellas. The object detection pools a large area of many umbrellas into one, suggesting the estimate of the count of umbrellas in the image is conservative. The right image is from 17 November 2019, showing teargas and a protester holding an umbrella.

In the left image, the umbrella actant does not play a practical role as a tool of resistance. Instead, its translation seems to be more symbolic-visual, with protesters associating themselves with the umbrella to visualise a collective, peaceful disobedience. While it is raining in some images containing umbrellas, a robustness check linking umbrella prevalence and downfall statistics in Hong Kong verifies that umbrellas are not only present on days with rain (see Supplementary Material G).

The right image shows a practical-confrontational translation of the umbrella in the context of masked protesters during collisions at universities in Hong Kong. The practical function of the umbrella is to protect the protesters, rather than to symbolise peaceful, collective resistance. Here, the umbrella itself becomes an agentive mediator: its surface redirects police dye and tear-gas,

while protesters tactically position it to hide themselves and others. Many images with umbrellas from this period resemble the right image. This indicates that the umbrella actant has developed from a symbolic-visual translation into a more practical-confrontational translation as the protests grew more violent and intense.

To elaborate on this interpretation, we turn to analysis of actor-networks. Figure 6 shows actor-networks for the umbrella actant during three different protest periods, with the left network representing the earliest period and the right network representing the latest period (for full size, see Supplementary Material H).

Figure 6

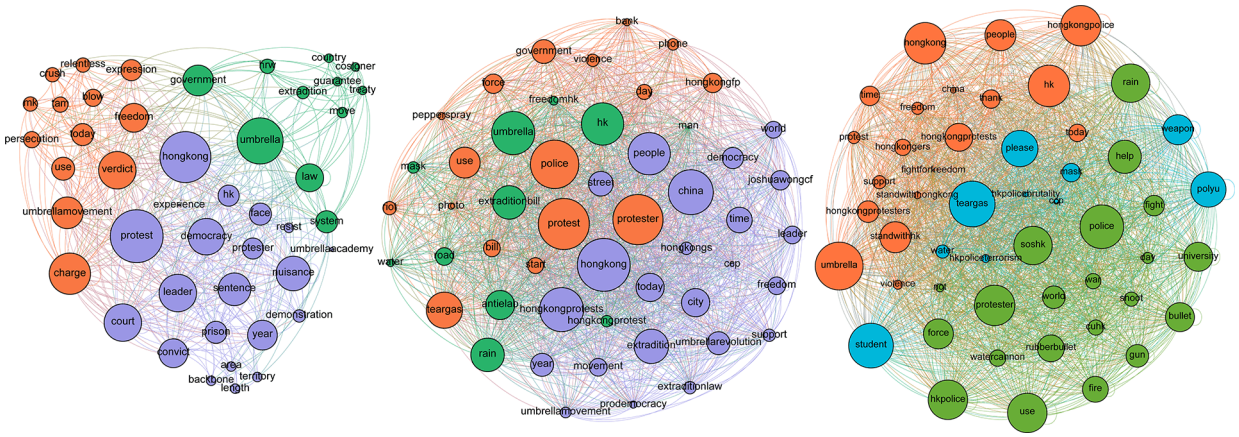

Fig. 6. Three actor-networks for the umbrella actant at different time points. On the left for period 1 (2019-04-08 – 2019-04-21), in the middle for period 2 (2019-06-04 – 2019-08-16), and on the right for period 3 (2019-11-10 – 2019-12-31). Node sizes denote degree centrality, and node colours denote cluster belongingness. All networks are visualised using the ForceAtlas2 algorithm.

In the left network in Figure 6, we identify three clusters. The purple cluster includes ‘democracy’ and ‘protest’. In the green cluster, nodes such as ‘extradition’ and ‘law’ are present, connecting the actant to the concurrent events in Hong Kong. By contrast, in the orange cluster, we observe rights and protest-related words, such as 'freedom', 'expression', and 'umbrellamovement'. This latter node explicitly points to the previous Hong Kong movement. With this translation, the act of tweeting umbrella-related content becomes a way to voice dissidence and attract attention to the protests, as exemplified by the tweet in Figure 7.

Figure 7

Fig. 7. Tweet from the umbrella sample containing the 'umbrellamovement' node for time period 2019-04-08 to 2019-04-21. Tweets for specific clusters and nodes were extracted by searching for the node word and extracting a random sample for the chosen time period. Afterwards, the sample was read manually.

As indicated in the tweet-text, the umbrella is associated with a vision of collective struggle. Based on this actor-network, we can conclude that the symbolic-visual translation of the umbrella actant dominated in the beginning stages of the Hong Kong protest.

In the middle actor-network, symbolic nodes still dominate in the purple cluster. However, the orange cluster now encompasses confrontational nodes such as 'police', 'pepperspray', and 'teargas'. This indicates that the umbrella is also translated into a practical-confrontational actant used to resist police violence, teargas, and pepper spray. While the second network covers both symbolic-visual and practical-confrontational translations, the third network is dominated by a practical-confrontational translation, where umbrellas are mobilized in protest situations to resist violence and oppression. Here, we see an overrepresentation of nodes with combat-oriented words in the teal and green clusters, such as 'war', 'watercannon', 'rubberbullet',

and ’fight’. During this period, violent collisions between protesters and riot police at universities in Hong Kong received great attention on Twitter, as exemplified by the tweet in Figure 8.

Figure 8

Fig. 8. Tweet from the umbrella sample containing the ‘rubberbullet’, ‘war’, and ‘watercannon’ nodes for time period 2019-11-10 to 2019-12-31.

In Figure 8, blue-dyed water is used by authorities, reportedly to mark protesters with the aim of later arresting them. Protesters, in turn, use umbrellas as a counter-surveillance strategy to avoid being marked.

In summary, we show how the umbrella, over time, develops from a symbolic-visual actant into a more practical-confrontational actant. The umbrella actant exemplifies how a symbol rooted in past protest repertoires can be reactivated and retranslated. Drawing on prior symbolic associations from the 2014 Umbrella Movement, the object initially functioned as a visual expression of peaceful disobedience. Over time, however, the umbrella was increasingly enrolled in confrontational settings as protesters used it to resist teargas, water cannons, and surveillance. From

an ANT perspective, its evolving translations reflect how actants accumulate new meanings as they are re-situated in actor-networks during interaction rituals. The umbrella's trajectory thus moves from symbolic-visual to practical-confrontational, revealing how symbols are not fixed but fluid, and shaped by both repertoires of meaning and material affordances in moments of escalating conflict.

Laser

Like the umbrella, the laser actant undergoes different translations during the Hong Kong protests. In some situations, the laser is translated practically, e.g., as a tool of resistance used to obfuscate the gaze of surveillance cameras, or to blind police forces in the streets (CNA, 2019). In other situations, lasers are used for more symbolic-visual purposes, e.g., to express peaceful, collective disobedience.

Unlike the umbrella actant, the symbolic importance of the laser pointer does not date back to the 2014 protests. We find very few tweets regarding lasers before August 2019, where its prevalence starts to accelerate, specifically in relation to an event, where a citizen is arrested for using laser pointers. Temporally, the laser actant rises to symbolic status in a period (Figure 9, network 2) where the umbrella begins to take on a more practical translation (Figure 6, network 2), taking over the (temporary) mantle as the key Anti-ELAB symbol. Figure 9 visualises three actor-networks for the laser actant, one before the activity for the laser actant increased, and two surrounding peaks in activity.

Figure 9

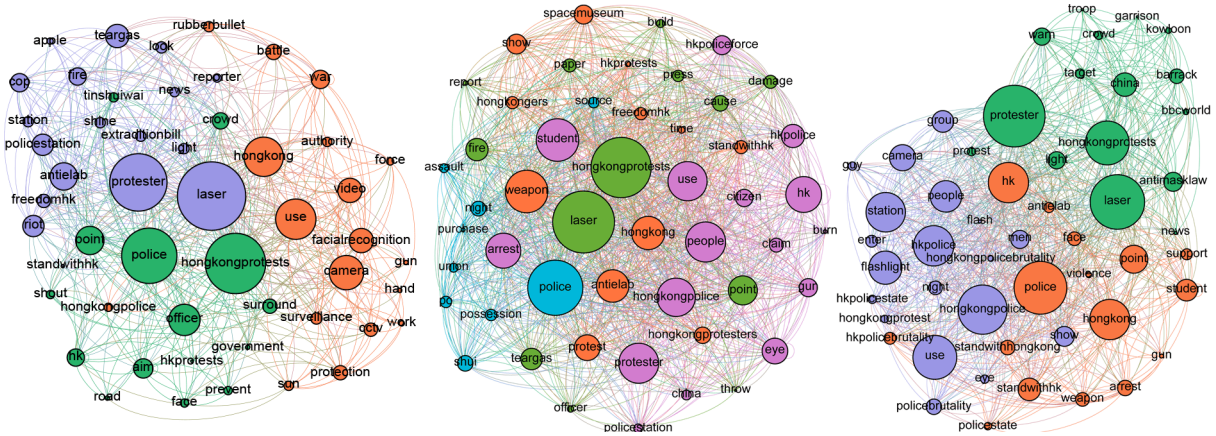

Fig. 9. Three actor-networks for the laser actant at different time points. On the left for period 1 (2019-07-25 – 2019-08-05), in the middle for period 2 (2019-08-06 – 2019-08-22), and on the right for period 3 (2019-10-25 – 2019-11-11). Node sizes denote degree centrality, and node colours denote cluster belongingness. All networks are visualised using the ForceAtlas2 algorithm.

In the left network, which covers about 1.5 weeks between July and August in 2019, we identify three clusters. The orange cluster encompasses nodes such as ‘facialrecognition’, ‘camera’, and ‘surveillance’, indicating a focus on lasers as tools for practical-confrontational purposes. In contrast, the purple cluster covers nodes, such as ‘policestation’, ‘shine’, and ‘antielab’, indicating the presence of a symbolic-visual translation. In Figure 10, we show examples of both translations contained in the clusters.

Figure 10

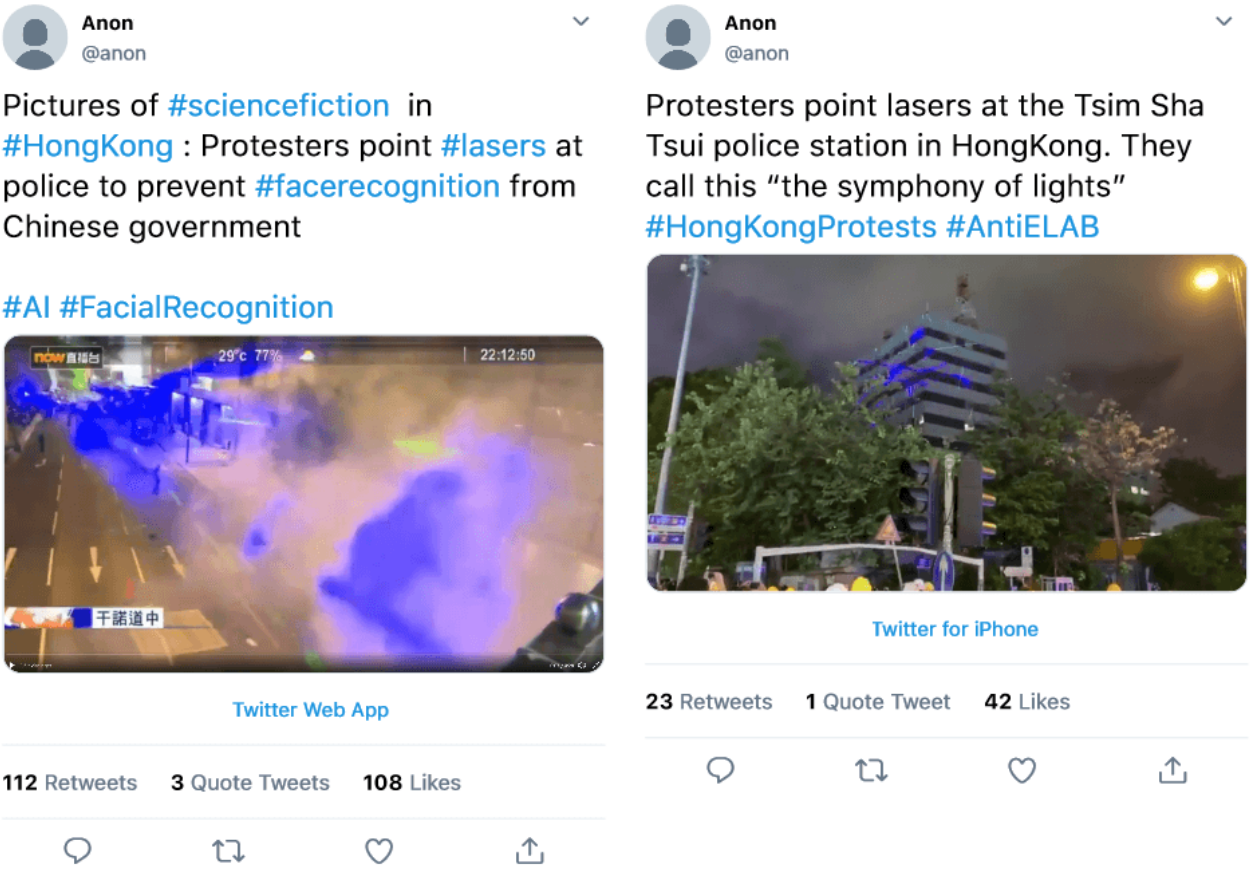

Fig. 10: Two images from the time period 2019-07-25 to 2019-08-05. On the left, a tweet containing the node 'facialrecognition' (from the orange cluster), and on the right, a tweet with the node 'policestation' (from the purple cluster).

While the symbolic-visual translation (Figure 10, right image) is clearly present in the first network, tweets associated with the practical-confrontational translation (Figure 10, left image) remain dominant during the first period (Figure 9, left network). This is also evident in the overall higher degree-score for the orange cluster compared to the purple cluster in the left network.

During the second period (Figure 9, middle network), starting on the date when a protester was arrested for using lasers, nodes associated with the symbolic-visual translation are dominant. Central nodes in this network (e.g., 'spacemuseum', 'show', and 'paper') point to demonstrations taking place in response to the arrest of the protester, and to the authorities' decision to categorise laser pointers as offensive weapons. The examples below relate to these demonstrations:

Figure 11

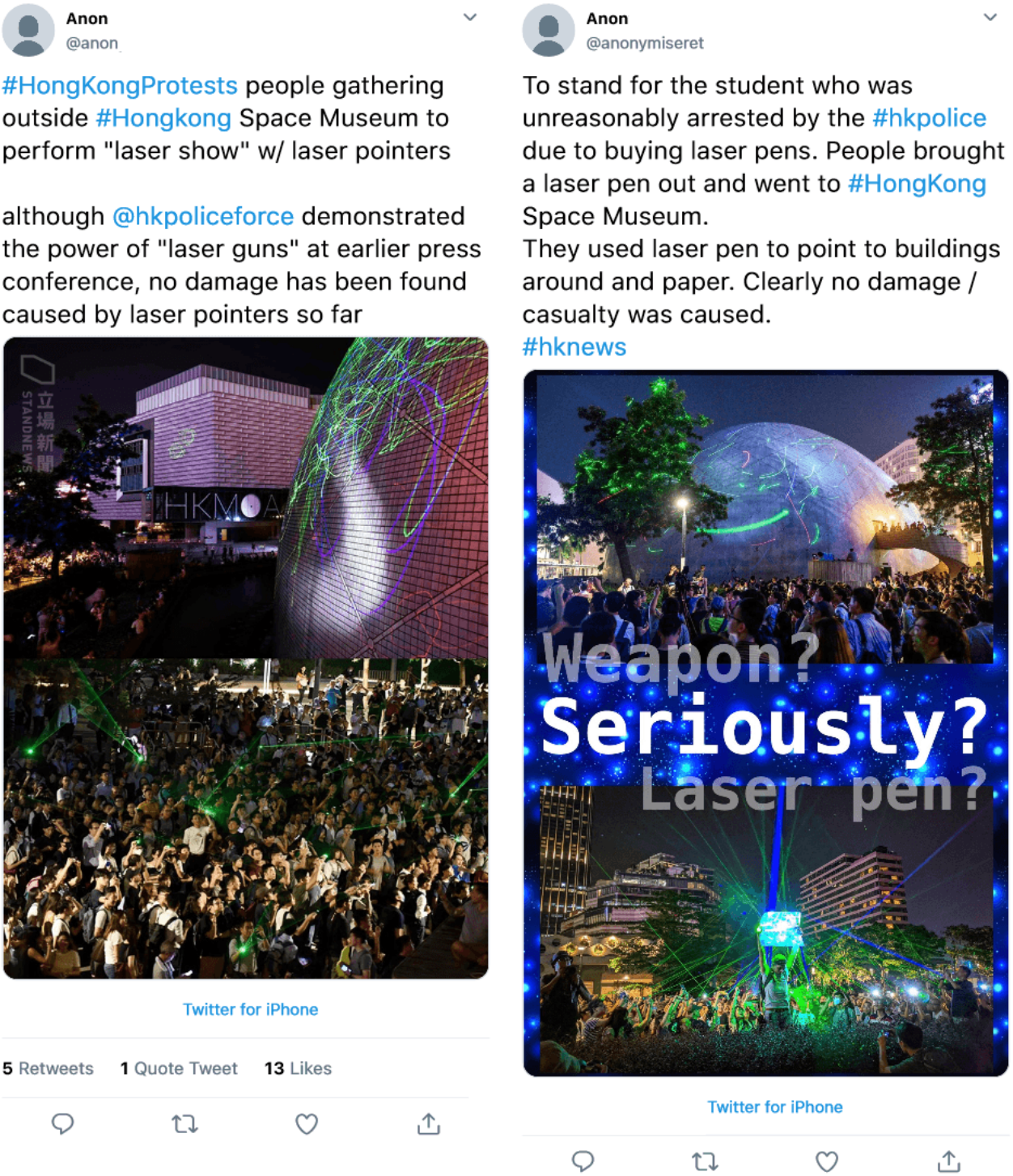

Fig. 11: Two images from the time period 2019-08-06 to 2019-08-16. On the left a tweet containing the node 'spacemuseum' and 'show' and on the right a tweet with the node 'paper'.

In the left image, protesters are pointing lasers towards Hong Kong's Space Museum to signal collective presence in the streets. In the right image, protesters point multiple lasers

towards a piece of paper to debunk the claim made by the Chinese authorities that lasers can be used as offensive weapons.

The swiftness of the laser's translation from a practical-confrontational actant to a symbolic-visual actant is remarkable, and so is its temporal dependency on the authorities' counter-translation of lasers as offensive weapons.

Fast-forwarding two months, the third network indicates a hybrid translation covering both practical-confrontational nodes (e.g., 'camera', 'eye', and 'violence') and symbolic-visual nodes (e.g., 'support' and 'barrack'). During this period, violent collisions were taking place at the universities in Hong Kong, which may be why the practical-confrontational translation resurfaces (see Supplementary Material I for details).

To conclude, the laser oscillates between a practical translation and a symbolic translation and then back to a hybrid between the two translations. Situating these shifts in terms of agency foregrounds how lasers, protesters, police optics, and legal designations continually reshape one another, producing the volatile chains of meaning we trace. While the laser actant stabilized as a dominant symbol during one period of the demonstrations (Figure 9, middle network), it ceased to be as dominant during the later period. The laser's transition from a noncentral object to a momentary symbol underscores how repression from authorities can produce symbolic translations of an actant. By framing lasers as weapons, authorities unintentionally amplified their visibility, prompting counter-translation of lasers as symbols that emphasized collectivity and irony. This case exemplifies how the transformation of actants into symbols is not only event-driven but relational and shaped by ongoing translation struggles between protesters and opponents. From an ANT perspective, the laser's enrollment in different actor-networks radically reshaped its meaning within a short timeframe, achieving only momentary status as a symbol for the collective.

Mask

The mask actant emerges as a key actant quite late in the Hong Kong protests. Protesters initially wore masks as protection against facial recognition and teargas. However, on 5 October 2019, the Lam administration passed a security law that included a ban on the use of all facial masks in public spaces. As a response, thousands of masked protesters marched the streets. In this case, masks came to serve as a visual symbol of resistance. This symbolic power was closely tied to their practical function: by concealing faces, masks helped protesters avoid surveillance, and the government's ban only reinforced their status as tools and signs of defiance. Figure 13 shows actor-networks for the mask actant during two different protest periods.

Figure 12

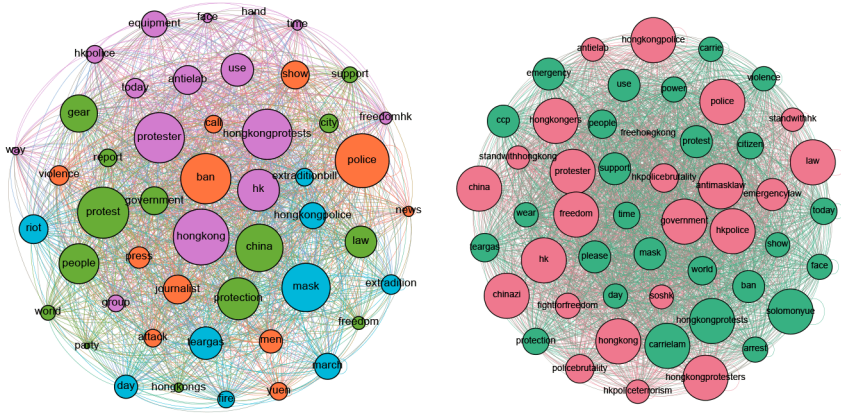

Fig. 12. Two actor-networks for the mask actant at different time points. On the left for period 1 (2019-02-11 – 2019-08-01), and on the right for period 2 (2019-09-24 – 2019-10-24). Node sizes denote degree centrality, and node colours denote cluster belongingness assigned by the modularity algorithm. Networks are visualised using the ForceAtlas2 algorithm.

In the left network, the 'teargas', 'protection', and 'face' nodes indicate a practical-confrontational translation, and the 'attack', 'violence', and 'police' suggest an orientation toward combat. Nodes related to a symbolic-visual translation are also present, e.g., 'freedom', 'support', and 'people'. However, the practical-confrontational translation dominates in degree centrality, as tweets mentioning masks are primarily in relation to police violence.

Figure 13

Fig. 13: Two tweets from the time period 2019-02-11 – 2019-08-01. On the left a tweet containing the nodes 'teargas', 'riot' and 'police'. On the right two tweets with the nodes 'facialrecognition', 'camera' and 'protect'.

In these examples, we observe two types of practical-confrontational translations of the mask actant. In the left tweet, protesters use masks to protect themselves against teargas and pepper spray. In the right tweets, protesters use masks to avoid being identified as dissidents by the authorities (through surveillance technology).

The network for time period 2 covers the period from the days leading up to the passing of the anti-mask law and three weeks onwards. In the pink cluster, the nodes 'antimasklaw', 'freedom', and 'chinazi' appear. The nodes indicate that the mask is seen as an actant that, like Hong Kong, is subject to China's repression. In the green cluster, the nodes 'support', 'please', and 'world' are present, which indicate that the mask actant is translated as a symbolic-visual actant, through

which the movement invokes visibility and sympathy from the international community. This is also reflected in the tweets below.

Figure 14

Fig. 14: Two tweets from the time period 2019-09-24 to 2019-10-24. On the left a tweet containing the nodes 'help', 'world' and 'please'. On the right, a tweet with the nodes 'world', 'india' and 'Xi Jinping', showing how Anti-ELAB symbols spread internationally.

In the left example, the Chinese attack on the mask actant translates it into a symbol of oppression and restriction of freedom in Hong Kong. The right example also shows a symbolic-visual translation of the mask actant. Here, the mask actant acts ironically, ridiculing Chinese President Xi Jinping and the anti-mask law, as an exercise of symbolic resistance to China.

Where the practical-confrontational translation of the mask actant was dominant during the previous period, the symbolic-visual translation dominates in time period 2. This is seen partly by the nodes present in the network and in the presented examples, partly by the fewer and smaller nodes indicating a practical translation, such as 'violence' and 'teargas'.

As the laser actant, the mask actant's trajectory flows from an initial practical-confrontational translation toward a symbolic-visual translation as it is faced with a counter-translation from authorities: the anti-mask law. Unlike the laser and umbrella, however, there is no evidence in the data that the mask's symbolic mobilization decreases and is later replaced by practical-confrontational translations. Rather, qualitative inquiry in the data suggests that the symbolic-visual translation persists for the remaining protest period.

The trajectory of the mask actant illustrates how visual objects can shift from tools into symbols in response to authority repression: while initially worn for protection, the mask became a central symbol of repression following the government's anti-mask law. From an ANT perspective, the mask's translation evolved through conflictual associations with both adversarial and supportive actants. Unlike the umbrella and laser, however, the symbolic-visual translation of the mask appears to persist in our data without being displaced. This suggests that some symbolic-visual translations of actants can become enduring narratives of injustice and identity when continuously being activated through highly visible interaction rituals in both local and transnational networks.

Discussion and conclusion

In this paper, we introduced the concept of momentary symbols to describe how certain objects achieve short-lived but intense symbolic roles within digital protest environments. Drawing on interaction ritual theory, we showed how these objects accumulate collective attention and emotional energy through short-lived shared focus. By tracing actor-networks over time, we show

how actants' meanings are continuously translated as they move across chains of translations. And through visual sociology, we demonstrated how visual objects mediate and amplify protest we-identity in temporally contingent ways.

Our analysis shows that the three outlined objects (umbrellas, lasers, and masks) oscillated between practical-confrontational translations (e.g. as weapons or shields in collisions with authorities) and symbolic-visual translations (e.g. as symbols that visualise collective resistance). Further, the shifts from practical-confrontational translations to symbolic-visual translations arose largely from clashes between authorities' surveillance efforts and protesters' counter-surveillance tactics, and cases wherein authorities mobilized counter-translations of the actants. Therefore, an object's translation at a given point in time hinged on the issues that were addressed by the collective at that time. This means that an object may be translated as a tool to fight off watercannons, pepper spray or video surveillance one day, while the next day being translated into a symbol for the collective's struggle or visual expression, for example if authorities outlaw its mobilization.

From our findings, we conclude that the process of symbol construction is temporally contingent in the case of the Anti-ELAB movement. The objects were less stable and lasting as symbols than expected, suggesting that such processes may be highly volatile in contemporary collectives. Our analysis reveals three key aspects that underpin the construction and volatility of momentary symbols. First, their emergence is driven by emotional intensification, as described by interaction ritual theory, and by clashes between heterogeneous actants, as emphasized in actor-network theory. In this interplay, visual actants become temporary foci of shared attention and emotional energy, while simultaneously being enrolled in confrontational relations with other actants such as surveillance technologies or police forces. Second, the symbolic volatility of these actants is shaped by temporally occurring counter-translations, when authorities challenge or

reframe their meaning, e.g., when lasers were designated as weapons or masks were outlawed. Third, the dynamics of digital communication contribute to the rapid acceleration and decay of actants' symbolic roles. The temporally compressed rhythms of online visibility, attention, and circulation (Lorenz-Spreen et al., 2019) make it possible for certain objects to be swiftly translated into dominant symbols, but also prone to displacement as new events unfold and attract collective attention. These three aspects help explain how symbols can emerge, peak, and recede within short cycles of protest activity and remain only momentary as opposed to enduring.

A key driver of volatility in our study is the contested nature of meaning-making among actors. While our ANT-inspired approach foregrounds translation, it is important to emphasise that the meaning of symbols is actively disputed. Lasers, for instance, were translated by authorities as offensive weapons, a move that prompted a counter-translation in which protesters publicly reframed lasers as symbolic, peaceful tools of resistance. In this sense, volatility stems from both temporal attention dynamics and strategic efforts by both authorities and protesters.

Methodologically, our study demonstrates the advantages of adopting a processual focus on visuality in collectives. The temporal contingency of the symbols that we highlight suggests that symbols are highly volatile constructs and that some objects may only become what we term *momentary symbols.* By this, we mean visual objects that for a limited time achieve a symbolic position in the collective before transforming into (or reverting to) a practical or non-symbolic position through quick acceleration and deceleration. In our analysis, this was the case for lasers that quickly became a dominant symbol but were just as quickly replaced. Adopting an ANT focus on chains of translations allowed us to temporally trace how non-human actants can assume a symbolic role in one link of the chain, while shifting to a practical translation in the next one. As such, ANT facilitates serious engagement with how symbols emerge and change over time. Lastly, the turn to digital trace data in sociology enables rigorous and granular temporally oriented analyses

that can identify both lasting and momentary symbols. By integrating ANT's emphasis on translation, interaction ritual theory's focus on affective rituals, and a quali-quant research design, we are able to trace not only *which* objects became symbols, but *how* their symbolic status was achieved, challenged, and ultimately transformed. This processual view shifts the analytical lens away from static lists of symbols or snapshots of meaning, and toward the mechanisms of symbol construction in digitally mediated protests.

Previous research on the Anti-ELAB movement's symbols largely revolves around the mask (Kwok, 2021; Pang, 2021), and does not describe lasers or umbrellas as symbols. The temporal contingency that we highlight indicates that such non-temporal studies run the risk of assigning too much weight to symbols that are only of momentary importance. By adopting a processual focus, researchers can track events throughout the entire protest period and identify a longer chain of momentary symbols that, like the mask, relate to counter-surveillance. By so doing, it is possible to attain a more dynamic and saturated understanding of collective's visual expressions. In the specific case of Anti-ELAB, this provided the insight that the symbol construction centered around issues of (counter)-surveillance.

While our analytical approach allows for a highly granular analysis of symbol construction processes, it also has limitations. First, we could only perform object detection for umbrellas, and, due to the low prevalence of the three actants relative to the total sample of images, manual annotation of randomly extracted images is unfeasible in this case. The absence of object detection for lasers and masks means that potential divergences between textual mention and visual appearance remain unexplored for these two actants. Second, the tweets related to the three objects comprise a small share of the full dataset, which questions their importance in online discussions of the Hong Kong protests. To mitigate the risk of confirmation bias, we used Gensim to extract the most common nouns in the data and found no indications of any relevant objects being missed in

the analysed timeframe. However, our analysis can be extended to consider for example helmets and face masks, that became prominent actants for the movement in the end stages of the protests (Kwok, 2021), as well as the competitive aspects between actants mobilized by the authorities in mainland China and Hong Kong against those mobilized by protesters. Further, our analysis indicates that tweets mentioning umbrellas, masks and lasers receive significantly more engagement than other tweets. Lastly, we acknowledge, following David Hume (2007), that assuming direct meanings in tweets overlooks irony and layered language, and that our focus on quantifying the mobilization of symbols cannot by itself reveal meaning-making surrounding the actants in specific contexts. Despite these limitations, our study demonstrates the relevance of using processual and temporal approaches to capture the erratic and volatile nature of visual expressions in social protests. In the future, researchers might employ this approach to study how symbols evolve and acquire new meanings in other contemporary collectives.

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Data availability statement: The data for this study consists of tweets collected during the research period. An anonymized dataset and a reproducibility package are publicly available at the Open Science Framework (OSF): https://osf.io/ts5jb/files/osfstorage