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Laying the foundations for a relational mixed methods social network analysis

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MINDING THE GAP BETWEEN CULTURE AND CONNECTIVITY

Laying the foundations for a relational mixed methods social network analysis

Petter Törnberg and Anton Törnberg

6.1 Introduction

There has long been a strong strand of network research that views structure (referring here to patterning of social connections among individuals or groups, often operationalized by dyadic social ties, actors nodes, etc.) and culture (referring here to, for example, meanings, local practices, discourses, and norms) as mutually constitutive and inextricably interlinked – an approach in particular made prominent through Emirbayer's (1997) manifesto for relational sociology (e.g., White, 1992; Emirbayer & Goodwin, 1994; Pachucki & Breiger, 2010; Mische, 2011). This relational perspective implies that social networks are essentially discursive, cultural products that should be analyzed with reference to the construction of meaning (Somers, 1994; Mische, 2003). Correspondingly, it is argued, discourse is a function of its contextual social network, without which its meaning is incomplete. Social networks and meaning-making are thus interlinked and co-evolving, as culture prods, evokes, and constitutes social networks, and social network structure, in turn, contextualizes meaning.

However, most empirical research, in particular that departing from formalized and computationally oriented approaches, tend to think of networks in graph theoretical terms: as patterns of relations between actors (Fuhse, 2015; Mische, 2003). Such a structuralist approach has proven highly useful for identifying the ways that network structure impacts social phenomena by enabling the use of sophisticated technical tools. Nonetheless, it does so at the cost of abstracting away the cultural and intersubjective contexts of social relations, systematically disregarding everything that cannot be brought into the network formulation. Similarly, discourse analysis and cultural analysis rarely take into account the relational context, treating discourse as independent of the social connections in and by which it is embedded and structured (Pachucki & Breiger, 2010; McLean, 2007; Ikegami, 2005). In other

words, while theoretical accounts understand culture and networks as intrinsically connected, most empirical analysis has tended to treat these domains as discrete realms rather than taking account of them together.

This paucity of empirical research departing from a perspective of culture and connectivity as inextricably interlinked, in spite of the firm theoretical and epistemological basis, may in part be due to the lack of a clear, coherent methodology. Both textual and discourse analysis and social network analysis (SNA) have hosts of toolkits and routines, well-understood methodologies, as well as institutional legitimacy, whereas the area of their intersection is poorly and sporadically charted, meaning that only the bravest – and most tenured – of explorers will dare to wander past the telltale signs of *hic sunt dracones*.

This methodological lacuna did not develop by happenstance. The co-constitution of connectivity and culture is easy enough to support with sublime theoretical arguments, but a different animal altogether to approach methodologically. The power of both domains in isolation comes precisely from their abstraction away of the other: the interpretative methods of studying culture and meaning typically abstract away anything that is not local, subjective, and interpretative, whereas the formalist methods of SNA often abstract away anything that is not a structural pattern (Fuhse, 2015). Such a division of labor is of course rather practical and efficient, and has produced plenty of significant contributions to the understanding of social life – but it is also a risky affair as it implies a consistent disregard of that which falls between the chairs; it brings the risk of reducing reality to its abstractions (Pachucki & Breiger, 2010). We do well to remind ourselves that each abstraction is necessarily partial: culture as a dynamic process of meaning-making leaves out the ways this process is contextualized and co-constructed by social networks.

With the network and discursive approaches, as with any methodology, there is a certain risk that our methodology will leak into our ontology: just like a good hammer, powerful methods can leave us seeing nails where we should be seeing screws. The social world contains rather few social networks that are untainted by cultural aspects (with exceptions of the methods themselves, which through, for example, social media, have indeed become rather important shapers of how individuals understand their social world, see Marres, 2017), but culture and connectivity tend to be aspects of single phenomena. Structure and culture are not independent layers of the social, but can only be distinguished analytically (Fuhse, 2015). Networks are not passive media for cultural spread, but they shape their cultural diffusants in their spread and are themselves constituted by cultural processes (e.g., talk or interaction). Network formulations drain their relations of their cultural contents and meanings and their active, subjective dimension, in the same way that discourse analysis drains the phenomena of their objective, structural components.

To alleviate this situation, the remainder of this chapter attempts to bring focus to the ways that cultural and connective aspects of social phenomena intersect and overlap – pointing to what is lost when we tear apart these mutually constitutive aspects of social life. It proposes a set of concrete ways that these various interlinkages can be empirically explored in a mixed methods (MM) approach,

using examples from ongoing research. The aim of this is to take a step toward a methodological toolkit capable of capturing the aspects of social life that fall between the chairs of connectivity and culture, helping us answer questions like: How can we study meaning as local and temporal in social groups? How can we understand social ties as discursive? How can we incorporate notions of reflexivity into network analysis? How can we take into account cultural processes or political structures that are not easily captured by network metrics? How do we take more seriously the multivocality of identity and social ties (Yeung, 2005; White, 2008)?

6.2 Between culture and connection

While cultural and structural aspects of social phenomena are highly entangled, these are nonetheless powerful analytical distinctions. We will therefore here use these distinctions to look at their interplay. As we have argued, meaning and cultural discourses inform – and are deeply embedded within – network patterns of social relationships. Culture and social relations hence empirically interpenetrate with and mutually condition one another so thoroughly that it is impossible to conceive of the one without the other. This is the respect in which culture can be said to constitute, in Charles Tilly's apt formulation, nothing less than the very "sinews" of social reality (Emirbayer & Goodwin, 1994, p. 1438).

However, as McLean (2007) has argued, "network analysis has often fallen prey to an over socialized and static conception of networks, treating network ties as simply constitutive of identities, without examining how they become constituted and how they are negotiated over time" (p. 16). While there has recently been a development toward more dynamic and flexible understandings of networks such as longitudinal network analysis (e.g., Froehlich, 2020b; Rienties & Nolan, 2014, Rienties, Johan, & Jindal-Snape, 2015), there is nonetheless a predominant tendency in empirical studies using network analysis to reify networks, that is, to treat network ties and nodes as if their meaning would be constant over time and space. In Fuhse's (2009, p. 52) words, "researchers often deal with 1s and 0s, for observed and non-observed dyadic relationships between actors. The 1s and 0s are, of course, rough abstractions of a complex social reality: a relationship is observed to exist or not to exist – depending on operational definitions of relationships". The black-on-whiteness of digital data in particular tends to trick us to believe that meaning is fixed, while it is perhaps more floating and flickering than ever before (Törnberg & Törnberg, 2018b). Accordingly, in White's (1992) words, "understanding actors' meanings is crucial for any analysis of social structure. Researchers must examine respondents' meanings and the networks of which they are a part" (p. 106).

In what follows, we distinguish between three ways in which networks and culture intersect and interact that tend to be left out when approaching social phenomena through an exclusively cultural or network approach. These approaches involve a more dynamic conception in which social networks are not just seen as location for or conduits of cultural formations, but rather as composed of culturally

constituted processes of communicative interaction (Mische, 2003). In this sense, they bridge the gap between formal network technologies and more interpretative approaches.

The first approach can be seen as network analysis reaching out toward culture, the second as discourse analysis reaching out toward network analysis, and the final focuses on what exists distinctly in-between. We refer to these approaches as: (1) discursive network analysis, focusing on how culture impact networks; (2) networked discourse analysis, focusing on the way networks impact the construction of meaning; and (3) nexus analysis, focusing on the emergent relationship between culture and networks.

In this description, we make use of examples from our own ongoing research, with the purpose of mapping a methodological MM path for how to study these intersections between relationality and culture – a path which the other chapters of this book are further staking out, and which we hope our readers will help to make more well-trodden.

6.3 Discursive network analysis: networks as containers of meaning

This approach departs from social networks, but focuses on the ways that these are imprinted with culture, and the ways that the meaning that they encode is constantly set in motion. Meaning and cultural factors thus contextualize networks, as networks are embedded within them. Not only do social categories and cultural models for relationships make for a particular ordering of network structure (i.e., identities, storytelling, etc.) affect the formation of networks, but the meaning of ties and nodes also varies in different cultural contexts and over time, as for example is well illustrated by the complex processes investigated in Längler, Brouwer, and Gruber (2020) and Murphy, Littlejohn, and Rienties (2020). This means that cultural changes in a sense 'destabilize the network abstraction', since network abstractions by necessity are built on a fixed meaning of nodes and ties. The network perspective only shows a lower-dimensional slice of the complex reality that is a social phenomenon – defenestrating all other aspects of social reality by reducing it to a simple representation. But, like any such abstraction, these other aspects of the social world will tend to continue to resurface as the world keeps moving (Fuhse, 2015).

These factors are too often neglected in applied SNA (Fuhse, 2009; Pachucki & Breiger, 2010). There is still a tendency to underemphasize the role of culture in defining networks and their components: the purely "structural" aspects of the networks are thus often emphasized, and even when interwoven with meaning, ties and their patterns are still thought of as stable entities and structures.

This approach thus focuses on what tends to be forgotten in applied network analysis, and in the two studies briefly described in the following sections we look specifically at the ways that social networks are cultural entities, whose meaning is local in time and space. These studies investigate the ways that discursive and

cultural elements play out and shape the networks in which they exist, and the way that networks are cultural products.

6.3.1 Studying networked communities

An intuitive way to approach this is to combine network analysis with looking at the cultural contents of the network studied (e.g., Rehm, Cornelissen, Notten, Daly, & Supovitz, 2020). This is the approach of an ongoing study by Wahlström, Törnberg, and Ekbrand (2018), looking at a large radical right Facebook group in Sweden with over 170,000 members ("Stand up for Sweden"). The authors first employ a community detection algorithm on the social network formed by users in the group liking each others posts, and then analyze the posts from these groups using an MM text analysis, combining topic modeling, term frequency, inverse document frequency, keyword analysis, and qualitative text analysis. Looking longitudinally, using these types of text analysis, a story emerges of the formation of the Facebook group as a struggle between three competing internal groups. These groups differ in both their political agenda and the type of activity they are engaged in. For instance, the smallest community was active from the start of the group and comprise the most active users in the Facebook group. Despite its limited size, this group is responsible for most of the posts in the group, and the group's users also tend to link to various radical right blogs and alternative media. The two other larger groups contain more "mainstream users" and tend to post comments rather than original posts. Interestingly, while the second group was very active in the early days of the group, it was relatively rapidly replaced by the third group. These three groups are thus formed as a consequence of various political interests and struggles of meaning-making within the Facebook group. A major conflict recently emerged in the group between a more radical flank and a larger, more moderate flank, which resulted in increasing fragmentation in the Facebook group as a whole.

This example illustrates that while most social networks are formed as a static aggregation of various social interactions over time, the nature and character of these aggregations can often be revealed by supplementing the network analysis with, for example, text analysis. This suggests an iterative approach that moves back and forth between networks and content analysis, recursively studying what the network captures through interpretative analysis, and then using this to cut out new structural slices of the community. This is also illustrated in the approach taken in Rehm et al. (2020), that combines/integrates SNA with text analyses of tweets and semi-structured interviews, looking longitudinally at how Dutch teachers and stakeholders discussed educational policy innovation.

6.3.2 Communities of diffusion

The approach sketched out in the previous section focuses on the ways that networks are entangled with, and the expression of, cultural processes, and the ways that various aspects of these are lost in the network representation. An alternative

approach instead departs from the perspective of the network as a cultural conduit, that carries within it cultural entities. This is the approach of the diffusion perspective (e.g., Rogers, 2010), which has long been an important way to studying the structural aspects of the dynamics of cultural change. Just as with the social network approach, however, this tends to leave out the complex interplay between structural and cultural aspects of social phenomena.

An ongoing study by Keuchenius, Törnberg, and Uitermark (2018) develops a diffusion approach that attempts to address this by taking into account the ways the structural and cultural aspects of social phenomena interplay and are co-constituted in the spread of scientific ideas between academic communities. This project uses Web of Science data to construct a citation network of scholars who all cite a common paper – Granovetter's (1973) article on the strength of weak ties. The aim is to look at the diffusion of this idea through the scientific network, and to look at the ways that it not only is adopted – but also simultaneously adapted and transformed. We do this by combining topic modeling and close reading, showing that the diffusion network features communities of scholars who interpret and use Granovetter's hypothesis in distinct ways. Such communities collaboratively interpret Granovetter's hypothesis to amend it to their specific perspectives and interests. A similar approach is also highlighted in Froehlich (2020a) who conducted a similar analyses on studies using MM and SNA.

Our analysis further shows that communities are clustered around figureheads; that is, scholars who are central within their communities and perform pivotal roles in translating the general hypothesis into their specific field. Different communities have radically different interpretations of the hypothesis that fit into their general cultural perspective – and there is a contestation with what is the correct meaning.

This approach links the question of exaptation that has recently come of interest in innovation literature (Lane, Pumain, van der Leeuw, & West, 2009; Lane, 2016). This notion focuses on the way that cultural artifacts tend to be used for, and transformed to fit, purposes for which they were never originally intended. This means that cultural innovations become what they are first when they enter into an "artifact–actor" network (Lane et al., 2009), and become interpreted and used by a community. A large part of any cultural innovation lies within its community of users and their collective meaning-making.

This study thus illustrates how ideas do not diffuse over a network as static entities, but are adapted and adopted, and, in turn, transform the nodes and ties over which they spread: the groups are defined by their content; they are fundamentally the cultural sum of the diffusants. Each cultural piece is added to their repertoire shaping how they interpret and adapt the next, in a complex path-dependent process.

Together, these studies imply a methodology that departs from a network, but borrows from the cultural analysis an understanding of meaning as fluid, and local to time and space. This implies returning frequently to the meaning of one's network, questioning what is captured by its ties and nodes. Additionally, such a methodology further explores the content and the self-understanding and reflexivity of

the individuals and groups described by the network, which can only be captured by going back and forth between structure and content analysis.

6.4 Networked discourse analysis: social networks as the habitat of cultural forms

Having seen examples of how network analysis can in practical research begin to reach out toward more cultural perspectives, we now turn to look at the other side of the chasm: how discursive approaches can begin to reach out toward more structural perspectives. Just like SNA tends to leave out what cannot be captured in its models, analysis of discourse and culture tend to leave out their structural aspects, and the ways that culture is positioned and co-constituted by social networks. Accordingly, this approach focuses specifically on the ways that discourses and meaning-making exist and play out in relations.

Networks provide certain structural conditions that contextualize and carry meaning: they thus provide the infrastructure in which meaning emerges and disseminates. In this sense, social networks are the habitat of cultural forms. Discourse and symbolic forms diffuse in social networks, and they meet and combine at network intersections to form new styles and creativity. This approach thus focuses on the connective aspects of cultural phenomena that tend to be neglected in most cultural and discursive analysis.

6.4.1 Becoming a racist

One of the most manifest examples of culture being shaped by community is the process in which individuals become radicalized by extremist groups. This is generally understood as the result of individuals engaging with communities, leading to an exploration of extremist ideologies within peer groups, the intensification of beliefs, and the creation of a feeling of duty to take part in extremist activity (Meleagrou-Hitchens, Alexander, & Kaderbhai, 2017). This emphasizes both the ways we are culturally shaped by our relational context, and the way that "one of the tasks of discourse is the construction of social relations" (Mische, 2003, p. 264).

In an ongoing study we look at radicalization processes within the radical right online, through the lens of data collected from the world's largest white-power forum, Stormfront.org, with over 320,000 members and discussions spanning 20 years (Törnberg & Törnberg, 2018a). This forum is regarded not only as an important space for ideological debate, planning upcoming activities, and open discussions about strategies and tactics, but also as a central hub for the recruitment and radicalization of new members.

To study radicalization, we look at the co-evolution between social ties and discursive change. We use information theory measures to look at the ways the discourses of individual users converge with the overall community over time, as they interact and exchange messages. This captures how different local communities in the network have different cultures and discourses, and that structural aspects

affect the recruitment of new users into their discourses. In the analysis, we observe adjustments among new users over time who gradually start using a similar terminology as more established users. This cultural adaptation also entails seeing oneself less as an individual, and more as part of a community. As users converge with the community, they go from referring to themselves as "I", to increasingly using the plural "we".

This study thus approaches language not merely as the creation of the speaking subject; rather the subject becomes so only by schooling his/her speech to a socially determined system of linguistic prescriptions. As Collins (2003, 2014) argues, interaction in networks is deeply implicated in local microcultures, and we shape our interactions according to these cultures. Furthermore, the network structure itself is not passive in this process, but plays a role in shaping which content is most likely to spread, and what cultures become dominant, as Törnberg (2018a) uses a network simulation model to show.

6.4.2 Advertising gender on social media

While white-power radicalization provides a powerful example of how our meaning-making processes are shaped by our relations and interactions, one does not need to go to such extremes to see the ways we are shaped by our relational context. In an ongoing study, Törnberg (2017) looks at the more mundane example of gender roles on social media, looking at the policing and perpetuation of gender stereotypes in images on Instagram, and the ways they relate to identity formation.

As advertisement has now to large extent moved to social media platforms, and become irreparably entangled with everyday social interaction, the study departs from Goffman's (1979) categorization of how gender identity is expressed and constructed within advertisement to look at self-representation on social media, as well as at what appraisal such performances receive from their audience. The study does this through applying machine learning–based image analysis on about 500,000 photographs of men and women from Instagram, combined with textual analysis of the comments that these images receive.

This begs the question of how to conceptualize social media interactions. While common approaches depart either from network or content analysis, the perspective of Goffman (e.g., 1978, 1979) highlights the question of what we are doing, and how we are made, when we are interacting. Social media tend to be organized around the formation and expression of identity, providing stages or narrative surfaces – a "wall", "timeline", or "presentation page" – on which we may "write yourself into being" (Sundén, 2002) and play out our performances. This allows a type of expression that is simultaneously expressive ("this is me"), strategic (attempts at achieving certain goals), reflexive (ways of exploring one's own identity), and communicative (part of a dialogue) (Siibak, 2009). Social media simultaneously provide ways of providing feedback to, or even policing, these identity formation processes: the audience, in turn, is given the possibility to applaud these performances through likes or hearts, or give shouts of validation or admonishment by leaving comment.

This implies that, while the interaction carried out on these narrative surfaces can be seen through the traditional lens of social interaction – ties and nodes – this instead focuses on the difficult question of what those ties and nodes actually represent. While the subjective aspects of identity implies an understanding of one's own relation to others (Taylor, 1989), this develops in relationships, in which identity is the face of actors: it is transaction and performance (McCall & Simmons, 1966). Actors engage in impression management in order to convey a certain image to others, and this may either fail or be successful, depending on the reactions of the audience (Goffman, 1978). In this sense, the reactions of others are like a mirror, in which our identities are shaped and reshaped through repeated attempts at self-representation, in a continual process of recreation (Sundén, 2002). As Yeung and Levi Martin (2003) have shown, the subjective and the social level of identity are strongly intertwined.

Coming from this perspective, this study shows that gender stereotypes that Goffman (1979) identified indeed continue to be present in the self-representation imagery of contemporary social media. The study also finds that it is surprisingly hard to find explicit policing of gender roles on the platform. Indeed, the analysis reveals, in particular for younger users, that meaning exchange on the platform often has little to do with the meaning explicit in the comments; rather, the relational context carries such powerful implicit social expectations for the interaction that takes place that the context often is more important than the actual content exchanged in the determination of the meaning of the interaction. If, for instance, a teenager posts a selfie and a close friend does not comment on it, or an acquaintance does not reciprocate for previous interaction, this can spell an emotional and social catastrophe. As previous interview studies have shown (Forsman, 2014), the users themselves think of their context through the networks provided by the platforms: they report having a diagram of relations between everyone in their heads, through which they dissect and calibrate strategies. This reveals how while the methods of social science imply assumptions about the nature of the social world that may not be based in empirical reality, social life itself is also methodical, and methods thus shape the form that it also takes (Marres, 2017). In this way, networks and relations are crucial for understanding meaning on the platform.

A factor that this analysis finds, that makes the question of the relationship between culture and connectivity even more perplexing, is the observation that social media clearly consists of a collection of subcultures (e.g., Boy & Uitermark, 2017), which differ between each other not only in the way that contextual relational aspects are determining the meaning of content, but also the extent to which this is the case. In other words, the very relation between structural and cultural aspects of social phenomena are local.

Together, these studies imply a methodological approach where the meaning of discourses is in part determined by the structural aspects of culture, meaning that discourse analysis need to take into account the network context. Discourse tends

to involve impression management, which, in turn, implies an audience and a context, without which meaning cannot be fully established.

6.5 Nexus analysis: feedback between networks and meaning

While discursive and relational approaches reaching out toward each other may take us a long way toward bridging the gap between the two, there remains a question of that which lies distinctly between the two, and that has been the emphasis of neither. The focus of this approach lies on studying phenomena that result from the dynamic interaction between the two realms. Such phenomena tend to be highly illusive, often involving non-linear dynamics that require the application of methods that remain uncommon within the social sciences, such as simulations and mathematical modeling.

An ongoing study by Törnberg (2018b) suggests that the phenomenon of so-called echo chambers, which has come under recent scrutiny, may be seen as an example of such a phenomenon. The notion of echo chambers suggests that online environments have increased the possibility for us to come together into like-minded social groups that comfort us with reaffirmation and protect us from disagreement, thereby reinforcing existing perspectives and fostering confirmation biases.

The study uses computer simulation to study the ways that cultural and relational aspects interact in order to produce surprising levels of polarization. The simulation model has three steps that constitute its dynamics. The first step of the model emphasizes the dynamics of the relational aspects of echo chambers. It captures how we choose with whom we interact in social media, departing from the famous Schelling (1971) segregation model, which showed that very minor micro-level preferences are capable of producing complete macro-level segregation. If an agent finds itself in a small-enough opinion minority among its social network or its interaction channel, it will randomly change friends or environment. The result of this model implies that the results of the Schelling segregation applies much more broadly than the initial model suggests: it plays out also in a broad range of interaction media, such as in networks and between groups.

The second step of the model captures the cultural dynamics. This uses a version of Banisch and Olbrich (2018) model of opinion dynamics that describes our opinions as the result of positive or negative feedback from a social group. This means that if one is in a homogeneous group of like-minded, one is likely to have stronger opinions than if one is part of a more heterogeneous group. This dynamic finds strong support in social psychology (e.g., Brewer, 1991).

The third step implies integrating these two models into a single dynamic. This results, within a certain parameter space, is a feedback where the self-segregation model produces higher levels of sorting than one would expect, which then results in the opinion dynamics model producing stronger opinions among the agents.

This, in turn, will feed back into further strengthening the segregation dynamics. The result becomes a feedback toward spiraling polarization, where the mechanisms lies neither completely within the relational nor the cultural realm, but in their intersection.

This type of complex dynamics, which the model describes, may be pervasive and an important part of the social world: we would be none the wiser if they were, due to their methodological inaccessibility. To explore such phenomena, new forms of abstractions are necessary, capable of revealing nonlinear dynamics, such as, for instance, agent-based models (Macy & Willer, 2002).

6.6 Conclusion

The analytic separation between structure and culture in empirical research has enabled the employment of powerful methods and have allowed for a wide array of fruitful research. But there is always a risk of conflating reality with our abstraction, and thereby losing aspects of reality that exist in the overlap and interaction between these two categories. This chapter has attempted to mitigate this by adding three additional approaches based on this abstraction, but that highlight that networks and culture are two aspects of the same phenomenon.

The open nature of the social world means that there is no universal method or type of abstraction that is capable of dealing with social phenomena in their entirety. This means that we need to combine different methods and abstractions to cast light on different aspects. "All theorizing in science involves abstractions (or isolations) that involve some partial or temporary closure in the theory (Hodgson, 2006, p. 3). This implies that it is not enough to attempt to fill the lacuna between these approaches with yet new approaches, but that we must also be prepared to "look behind the abstractions and assumptions of this analytical picture of networks – at what the picture is designed to depict" (Fuhse, 2009, p. 52). This is fundamentally the core of the MM approach, since to "focus competently on specific aspects requires an understanding of the totality" (Lawson, 2005, p. 47).

Any method is based on an abstraction, functioning as a spotlight directed on the research object, causing it to cast a shadow on the wall that we can study, measure, and debate. But just like the prisoners in Plato's allegory of the cave, focusing on this shadow-play leaves us at the risk of forgetting that they are merely shadows. It is necessary to, like Plato's protagonist, once in a while free ourselves from our methodological chains, and go outside to let our eyes adjust to the light, showing us in all their complexity the context and ways in which our shadows are produced. But the role of researcher remains in the cave, and so, there we must return. We cannot study reality without abstractions, but remain forced to see it through the world of shadows. The best we can do is to try to position our spotlights as to throw shadows that together reveal something of the full multidimensionality of the social world, glimpses that we may then stitch together to a coherent image.

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