

TWITTER AND SOCIETY



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TWITTER AND SOCIETY

EDITED BY KATRIN WELLER, AXEL BRUNS,
JEAN BURGESS, MERJA MAHRT, & CORNELIUS PUSCHMANN



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Table of Contents

Foreword: Debanalising Twitter:	
The Transformation of an Object of Study	ix
<i>Richard Rogers</i>	
Acknowledgments	xxvii
Twitter and Society: An Introduction	xxix
<i>Katrin Weller, Axel Bruns, Jean Burgess, Merja Mahrt,</i>	
<i>& Cornelius Puschmann</i>	

Part I: Concepts and Methods

CONCEPTS

1 Twitter and the Rise of Personal Publics	3
<i>Jan-Hinrik Schmidt</i>	
2 Structural Layers of Communication on Twitter	15
<i>Axel Bruns & Hallvard Moe</i>	
3 Structure of Twitter: Social and Technical	29
<i>Alexander Halavais</i>	
4 The Politics of Twitter Data	43
<i>Cornelius Puschmann & Jean Burgess</i>	

METHODS

5	Data Collection on Twitter <i>Devin Gaffney & Cornelius Puschmann</i>	55
6	Metrics for Understanding Communication on Twitter <i>Axel Bruns & Stefan Stieglitz</i>	69
7	Sentiment Analysis and Time Series with Twitter <i>Mike Thelwall</i>	83
8	Computer-Assisted Content Analysis of Twitter Data <i>Jessica Einspänner, Mark Dang-Anh, & Caja Thimm</i>	97
9	Ethnographic and Qualitative Research on Twitter <i>Alice E. Marwick</i>	109
10	Legal Questions of Twitter Research <i>Michael Beurskens</i>	123

Part II: Perspectives and Practices

PERSPECTIVES

11	From #FollowFriday to YOLO: Exploring the Cultural Salience of Twitter Memes <i>Alex Leavitt</i>	137
12	Twitter and Geographical Location <i>Rowan Wilken</i>	155
13	Privacy on Twitter, Twitter on Privacy <i>Michael Zimmer & Nicholas Proferes</i>	169
14	Automated Twitter Accounts <i>Miranda Mowbray</i>	183
15	Information Retrieval for Twitter Data <i>Ke Tao, Claudia Hauff, Fabian Abel, & Geert-Jan Houben</i>	195
16	Documenting Contemporary Society by Preserving Relevant Information from Twitter <i>Thomas Risse, Wim Peters, Pierre Senellart, & Diana Maynard</i>	207

PRACTICES**POPULAR CULTURE**

17	The Perils and Pleasures of Tweeting with Fans <i>Nancy Baym</i>	221
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18	Tweeting about the Telly: Live TV, Audiences, and Social Media <i>Stephen Harrington</i>	237
19	Following the Yellow Jersey: Tweeting the Tour de France <i>Tim Highfield</i>	249
20	Twitter and Sports: Football Fandom in Emerging and Established Markets <i>Axel Bruns, Katrin Weller, & Stephen Harrington</i>	263
BRAND COMMUNICATION		
21	Public Enterprise-Related Communication and Its Impact on Social Media Issue Management <i>Stefan Stieglitz & Nina Krüger</i>	281
22	Twitter, Brands, and User Engagement <i>Tanya Nitins & Jean Burgess</i>	293
POLITICS AND ACTIVISM		
23	Political Discourses on Twitter: Networking Topics, Objects, and People <i>Axel Maireder & Julian Ausserhofer</i>	305
24	Twitter in Politics and Elections: Insights from Scandinavia <i>Anders Olof Larsson & Hallvard Moe</i>	319
25	The Gift of the Gab: Retweet Cartels and Gift Economies on Twitter <i>Johannes Paßmann, Thomas Boeschoten, & Mirko Tobias Schäfer</i>	331
JOURNALISM		
26	The Use of Twitter by Professional Journalists: Results of a Newsroom Survey in Germany <i>Christoph Neuberger, Hanna Jo vom Hofe, & Christian Nuernbergk</i>	345
27	Twitter as an Ambient News Network <i>Alfred Hermida</i>	359
CRISIS COMMUNICATION		
28	Crisis Communication in Natural Disasters: The Queensland Floods and Christchurch Earthquakes <i>Axel Bruns & Jean Burgess</i>	373

29	Twitpic-ing the Riots: Analysing Images Shared on Twitter during the 2011 U.K. Riots <i>Farida Vis, Simon Faulkner, Katy Parry, Yana Manyukhina, & Lisa Evans</i>	385
TWITTER IN ACADEMIA		
30	Twitter in Scholarly Communication <i>Merja Mahrt, Katrin Weller, & Isabella Peters</i>	399
31	How Useful Is Twitter for Learning in Massive Communities? An Analysis of Two MOOCs <i>Timo van Treeck & Martin Ebner</i>	411
	Epilogue: Why Study Twitter? <i>Cornelius Puschmann, Axel Bruns, Merja Mahrt, Katrin Weller, and Jean Burgess</i>	425
	Notes on Contributors	433



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Structural Layers of Communication on Twitter

2

CHAPTER Axel Bruns and Hallvard Moe



.@replies, followers, #hashtags:
tweets reach very different audiences
depending on how they're addressed

Twitter is used for a range of communicative purposes. These extend from personal tweets that address what used to be Twitter's default question, "What's happening?", through one-on-one @reply conversations between close friends and attempts at getting the attention of celebrities and other public actors, to discussions in communities built around specific issues—and back again to broadcast-style statements from well-known individuals and brands to their potentially very large retinue of followers.

These different uses of Twitter are intended for, visible to, and able to reach vastly different subsets of the total Twitter user base. However, in the practical understanding of Twitter users, as well as in the existing body of Twitter research, they—and their overlap and interweaving—are often treated with insufficient clarity, and collapsed simply into a cover-all category of "Twitter use". It becomes necessary, therefore, to untangle these different modes of using Twitter

and to define them clearly, in order to provide a basis for the Twitter research presented in this volume as well as for the further work that will follow after it.

In this chapter we propose a conceptual model that defines these different modes of communication. We introduce three key layers of communication on Twitter: the micro level of interpersonal communication, the meso level of follower-followee networks, and the macro level of hashtag-based exchanges; we then show how these layers are interconnected in a variety of ways.

This layered structure of communicative exchanges provides a wider context for existing Twitter research, much of which focusses on specific layers within this framework—most frequently, on hashtag communities operating at the macro level. The broader framework we introduce here serves as a necessary foundation for the development of more sophisticated approaches to the study of Twitter as a communicative system, incorporating such single-layer studies into a more comprehensive, multilayer understanding of Twitter as a communication tool. Extending the existing body of literature, we call for new research approaches which move beyond investigating just one of these three layers.

LAYERS OF COMMUNICATION ON TWITTER

The key modes of communication on Twitter are linked to the specific technological affordances of Twitter as a platform, and can be understood as corresponding to micro, meso, and macro layers of information exchange and user interaction. We start from the default level of Twitter communication, which we will describe as the meso layer.

MESO: FOLLOWER-FOLLOWEE NETWORKS

Among the most fundamental affordances which determine the flow of information on Twitter is the capacity for its users to follow one another—that is, to subscribe to the stream of updates originating from the followed user. Following is not necessarily reciprocal—a user may follow any other user (with the exception of ‘private’ accounts) without requiring the other user to follow back in return; additionally, other than to follow accounts which have been set to ‘private’ by their owner, no permission is required to follow another Twitter user.

Once an account has gained followers, the tweets posted by the owner of that account will reach all those users who follow the account—if they actively monitor the tweets originating from their network of followed accounts. This default level of tweet dissemination across the follower-followee network upon

which Twitter is fundamentally based constitutes the meso layer of communication. Tweets posted (from non-‘private’ accounts) are public, and in principle, accessible to anyone using the Twitter search functions or visiting the account’s profile page—however, the primary intended audience for standard tweets posted by a regular Twitter user is constituted by the account’s followers.

In Schmidt’s terminology, introduced in Chapter 1 of this volume, this group of followers is the account owner’s “personal public”. By analogy, for the majority of Twitter users, it can be argued that tweeting to an imagined audience made up of one’s followers is similar to making a public statement to a known group of friends and acquaintances—a speech at a family gathering, a lecture to a class of students. The user addresses a group of at least broadly known others whose numbers are limited, and who may or may not pay attention to the statements made. The analogy breaks down, however, for accounts with very large follower networks—here, the exact make-up of the audience becomes too large to be known, or to be accurately imagined (see Marwick & boyd, 2011). This illustrates that the forms of mediated communication which social media support tend to constitute new models which do not have clear offline equivalents.

MACRO: HASHTAGGED EXCHANGES

Such meso layer communication, whose messages reach some hundreds or thousands of followers on average, arguably constitutes the vast majority of everyday communicative activity on Twitter, but is complemented by particular forms and formats of tweeting that use specific syntax to indicate an intention to extend or narrow the range of addressees. Of these, hashtags (simple keywords preceded by the hash symbol ‘#’) are commonly used to mark a tweet as being relevant to a specific topic and make it more easily discoverable to other users. These are not the only uses of hashtags, however, a point to which we will return below. (For a full discussion of the history of hashtags as a user-defined innovation on Twitter, see Halavais, Chapter 3 of this volume.)

The inclusion of a topical hashtag in a tweet means that the message has the potential to reach well beyond the user’s existing number of followers. Hashtags can work as markers of a topic, an issue, or an event—from Justin Bieber through the U.S. presidential election to the earthquake and tsunami which struck Japan (several chapters in the “Practices” section of Part II of this volume address such topical uses of hashtags)—and help to coordinate the exchange of information relevant to such topics. Twitter users are able to directly track such hashtagged

tweets, independent of whether the messages originate from accounts they already follow, or from previously unknown Twitter users.

In turn, including a hashtag in one's tweets signals a wish to take part in a wider communicative process, potentially with anyone interested in the same topic. Where used in such a way, hashtags can aid the rapid assembly of *ad hoc* issue publics (Bruns & Burgess, 2011b), especially also in response to breaking news or other sudden developments. Constituted independently of meso-level follower-followee networks, such publics can be more dynamic and ephemeral in their development, but can also solidify into long-standing communities of Twitter users.

The communicative flows which result from the establishment of active hashtag exchanges, at least in the short term, are usually less predictable than those enabled by follower-followee networks—but they are also amongst the most visible phenomena on Twitter, and most accessible to research. At the same time, however, even for well-established hashtags (and perhaps especially for hashtags with a high volume of tweets), it cannot be assumed that all users participating in—posting to—a hashtag public will also follow the full feed of tweets containing the hashtag: Twitter users may simply, speculatively include a hashtag to increase the visibility of their own messages, even if they do not themselves track the hashtagged tweets. The assumption that hashtagging does indeed improve the visibility of tweets cannot always be sustained, therefore: if all users were to use the hashtag simply to mark their own tweets, but did not themselves follow other users' hashtagged tweets, the primary utility of hashtagging would be negated.

This is true especially for what may be classed as non-topical hashtags, which are mainly used as emotive markers (#fail, #win, #facepalm, or #headdesk), but possibly also for popular memes (as explored by Leavitt in Chapter 11 of this volume): given the wide and incongruous variety of the tweets marked as such, it is highly unlikely that many Twitter users will deliberately subscribe to a hashtag feed such as #win, for example. The hashtags which do constitute the macro layer of Twitter communication largely represent the more topical uses of the hashtag syntax, therefore; most non-topical hashtags, by contrast, are used to enhance tweets from the meso layer.

By analogy, then, tweeting to a topical hashtag resembles a speech at a public gathering—a protest rally, an *ad hoc* assembly—of participants who do not necessarily know each other, but have been brought together by a shared theme, interest, or concern. Here, many voices may compete to make themselves heard, and their ability to do so above the fray depends largely on those

around them taking up the message and passing it on—on Twitter, by retweeting (a key practice we discuss below).

MICRO: @REPLY CONVERSATIONS

If the hashtag takes communication on Twitter from the meso to the macro layer, then, another communicative convention, which by now has been deeply embedded into the Twitter infrastructure itself, enables users to proceed in the opposite direction: towards the third, micro layer of communication on Twitter. By including an @mention of another user (that is, the addressee's username preceded by the '@' symbol), it becomes possible to highlight a tweet specifically to that user. The Twitter platform and standard Twitter client applications will specifically collect such @mentions and notify the recipient of incoming messages as they are received.

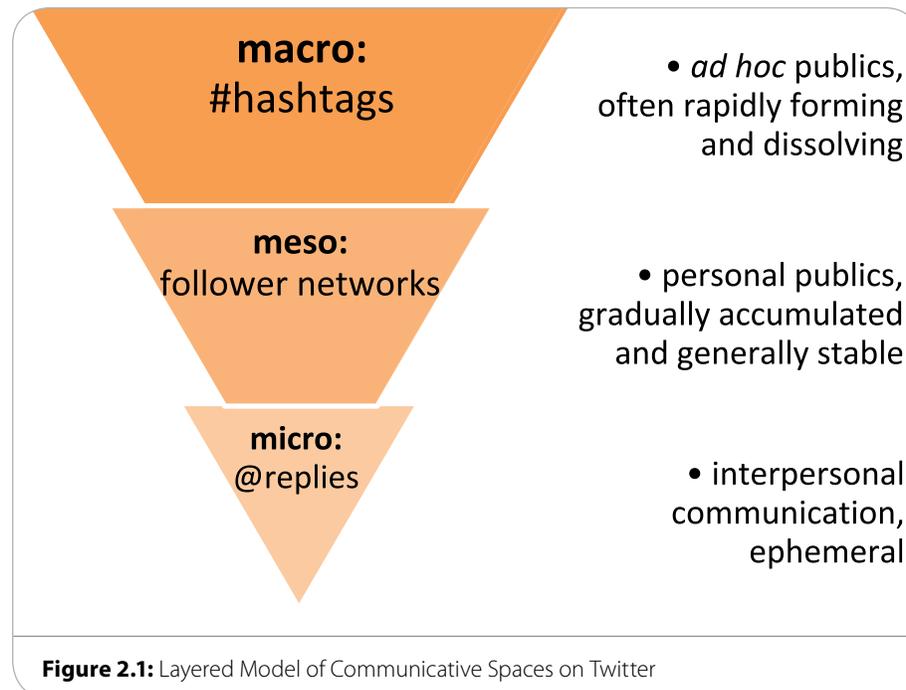
@mentions can be seen, therefore, as attempts to strike up a conversation with another Twitter user; any known Twitter user may be addressed in this way, regardless of whether the addressee is already connected to the sender through the meso layer of follower-followee networks or not. Where @mentions are reciprocated by their recipient, multi-turn exchanges of what can now accurately be described as @replies may eventuate; subject to the limited number of individual @mentions which may be contained in one 140-character tweet, this may involve a small group of participants.

While @mentions and @replies clearly indicate an underlying intention to specifically address one or more other Twitter users, over the total number of the sender's followers, Twitter infrastructure makes this implicit narrowing of communicative focus explicit at least if the tweet *begins* with the @mention of another user: if this is the case, the message is visible in most circumstances only to the sender and addressee, as well as to any users following both accounts. (It will also be visible on the sender's Twitter profile page, however, and in datasets retrieved through the Twitter API.)

@reply conversations constitute a micro-level layer of communicative activity on Twitter, then: though they may be visible to users beyond the actively engaged parties, they are centred around these principal participants first and foremost. Such conversations are analogous to an offline conversation with one or several friends or acquaintances, possibly conducted in the presence of a group of non-participating bystanders. (To ensure that their @reply conversations *are* visible to these non-participants, Twitter users have introduced the .@-syntax: as any tweet which does not begin with @username is visible to all of the sender's followers, prefixing the @reply with '.'—or any other character, in

fact—ensures full visibility of the message.) Much as is the case offline, too, to the extent that they are aware of the conversation, these bystanders may always enter it by sending their own @replies.

As with hashtags, however, here, too, it is important to note that not all @mentions are attempts to strike up a conversation—especially where the account referred to in the @mention belongs to a celebrity user, brand, or institution, the @mention may indeed be no more than a third-person mention of that user, by their Twitter handle rather than by their full name, as in “I support @BarackObama”. This distinction between explicit interpellation and simple reference is often far from clear, however: an @mention of a celebrity or brand may sometimes also be made in the hope that it does result in an @reply.



CROSS-LAYER COMMUNICATION FLOWS

As these descriptions of the three key layers of communication on Twitter already show, the layers do not exist in isolation from one another. While users are likely to envisage a specific set of primary addressees (that is, differently delimited publics—from tight personal networks to broad public assemblies) as they @reply with specific others, tweet general messages, or use hashtags,

they will usually be aware that their tweets may also reach users well beyond that initial set of addressees. In the first place, hashtagged tweets as well as @mentions (at least if the tweet does not begin with the @mention itself) will also always be visible to the followers of the message sender, of course: the meso layer serves as a default level of communication on Twitter which it is virtually impossible for users to elude.

But in addition to such inherent interconnections between the layers, determined by the fundamental technological affordances of the Twitter platform, many users also very actively and deliberately transition between the layers. This is self-evident in the use of @replies and hashtags as a means to move from the default meso layer to the more intimate micro layer or the more public macro layer of Twitter communication, but the reverse is also true: so, for example, the syntactic convention of the .@reply enables senders to move from the micro back to the meso layer, while the conscious choice to refrain from adding a known hashtag to an otherwise topical tweet can be regarded as a intentional move from the macro back to the meso layer.

Even direct moves between micro and macro are common: so, for example, an @reply response to a hashtagged tweet transitions the conversation, without a need for the conversation partners to follow one another at the meso level, directly from the broader public space of the hashtag to the one-on-one exchange of @mentions (especially if the @reply does not itself contain the hashtag, and is therefore visible in the first place only to sender and recipient, and any shared followers). Conversely, @replies—or retweets, as we will discuss shortly—which introduce a new hashtag suddenly make the interpersonal conversation visible to the undefined group of Twitter users following the hashtag.

Arguably, it is this flexibility of Twitter as a platform for public communication at various levels of ‘public-ness’, this versatility of transition between the three major layers of public communication, which serves as the fundament for Twitter’s considerable success as a social media service, and makes possible the wide range of uses which the remaining chapters in this collection outline. The triple-layer model (as illustrated in Figure 2.1)—which, it should be noted, evolved through a co-evolutionary process between the platform developers and their users, who introduced the @reply and hashtag conventions (see Halavais, Chapter 3 in this volume)—also constitutes a clear point of distinction from the other global social network, Facebook. The latter offers functionality in the first place for a form of semi-private, personal interactions which are situated somewhere between Twitter’s micro and meso layers, and supports macro layer communities only in the context of Facebook pages—but even here, not

with the ease of *ad hoc* creation and potential universal reach which Twitter hashtags afford their users.

The most important mechanism for transitioning between the three key layers of communication in Twitter deserves to be discussed separately, however: the retweet (in both its manual forms—e.g., “RT @user [original message]”—and in the form of verbatim ‘button retweets’). Retweets—another user-generated communicative convention on Twitter—constitute a mechanism which is inherently designed to move tweets across layer boundaries: Twitter users habitually use them to bring messages from the hashtag level to the attention of their own followers (in the form of manual or ‘button’ retweets), or even to that of specific recipients, e.g., through manual retweets to which they have added an @mention of the intended addressee: “Hey @recipient, look at this: RT @user [message] #[hashtag]”.

If such retweets direct information from the macro to the meso or even micro layer, the reverse is also true: retweets of incoming @replies, or of tweets sent by one of the user’s followees, can make these tweets visible to a considerably larger audience if a hashtag is added to the (in this scenario, necessarily manual) retweet. Here, messages from the micro or meso layer are brought to the attention of the macro layer audience by virtue of a newly hashtagged retweet; and even if no new hashtag is included, the retweet of an incoming @reply at least makes that message visible to all the retweeting user’s followers, thus transitioning it from the micro to the meso layer.

Finally, even if no new @mentions or hashtags are manually added in the process of retweeting a message—if the retweet is a verbatim ‘button’ retweet, for example—this passing-along of an incoming message at least fulfils the important function of *horizontally* transitioning the message, even if it remains in the same *vertical* layer of communication on Twitter. What such ‘simple’ retweets do is to move a message from the specific, meso-layer personal public of the originating user, constituted by that user’s Twitter followers, to the meso-layer personal public of the retweeter, thereby reaching a new and almost certainly different group of followers. As much as the *ad hoc* publics which can rapidly gather around hashtags, and operating in concert with them, this horizontal transitioning of messages through the meso-layer follower networks of individual users is responsible for the unprecedented effectiveness of Twitter as a medium for the dissemination of breaking news and rumours.

In this context, it is especially difficult to understand that Twitter and its developers have had a somewhat troubled relationship with the retweeting phenomenon and the functionality underlying it. Early retweeting was entirely

manual, but the various Twitter clients gradually automated the process (thereby also standardising the format to the most common “RT @user message” syntax). In late 2009, however, Twitter itself introduced an alternative retweeting mechanism, the ‘button retweet’ (named after the retweet button which was now displayed next to each message on the Twitter website and in authorised clients), which generated a verbatim, non-editable retweet.

While Twitter co-founder Evan Williams insisted that this new functionality was designed to simplify the retweeting process (Williams, 2009), to avoid the necessity of shortening original messages in order to insert the “RT @user” prefix, and to thus ensure accuracy in retweeting and evade any accidental or deliberate misrepresentation, this streamlined functionality also meant that adding hashtags, @mentions, or any other new material to the retweet was now no longer possible. Button retweets can no longer serve the function of transitioning tweets between the three layers of communication on Twitter, therefore—they can merely transition tweets horizontally. (See also Halavais, Chapter 3 in this volume, on the introduction of button retweets.)

For this reason, many Twitter users continue to use manual retweets; many third-party Twitter clients that had overzealously removed manual retweeting functionality quietly reinstated it as an alternative option; others never removed it in the first place. Notably, even some of Twitter’s own interfaces—at the time of writing, for example, the mobile Twitter websites for iOS devices, but not the Twitter website for desktop computers—once again offer a choice between button and manual retweets, if in a non-standard syntax (cf. Bruns, 2012). This betrays a limited understanding, on behalf of Twitter management and developers, of the wants and needs of the users of the platform, and of the three-layer structure of the key communicative channels which the platform offers—or indeed, a significant divergence in the aspirations which developers and users have for ‘their’ platform.

CONCLUSION: IMPLICATIONS FOR RESEARCH

The conceptual model for understanding flows of communication and information exchange on Twitter which we have outlined in this chapter has clear implications for how Twitter must be approached by researchers. For obvious practical reasons—hashtags are designed to make tweets more easily discoverable, after all—the majority of extant Twitter research has so far focussed on the macro layer of Twitter communication: on the engagement with breaking

news and other topics by participants in hashtag audiences (or, in some cases, hashtag communities, in the narrow sense of the term).

Such work has been able to demonstrate how Twitter users respond almost instantly to natural disasters (Bruns & Burgess, Chapter 28 in this volume; Bruns, Burgess, Crawford, & Shaw, 2012; Mendoza, Poblete, & Castillo, 2010), political unrest (Gaffney, 2010; Lotan, Graeff, Ananny, Gaffney, Pearce, & Boyd, 2011; Tonkin, Pfeiffer & Tourte, 2012), celebrity deaths, or other breaking news. It has also been able to illustrate how hashtag activities operate alongside and intersect with the mainstream media coverage of major events, from awards ceremonies (Highfield, Harrington, & Bruns, 2013) and political elections (Bruns & Burgess, 2011a; Larsson & Moe, 2012) through royal weddings to sporting contests. Extant research has also been able to trace how, around some long-standing hashtags, genuine communities of regular participants can form and evolve (e.g., Lindgren & Lundström, 2011; Moe, 2012). In doing so, this research has been able to document the utility of Twitter as a key many-to-many medium which complements, and sometimes even outperforms and supplants, conventional mass media.

However, despite this understandable and often appropriate emphasis on the macro layer, the findings of such studies must always be understood against the background of the greater conceptual model of Twitter communication as we have introduced it here. Hashtag activity in itself does not tell the full story of how Twitter and its users respond to a given event or engage with a given topic. While it may show how many users actively *posted* to the hashtag, it cannot even determine how many others *encountered* subsets of the total volume of hashtagged tweets because one or more of the users they follow were posting or sharing messages from the hashtag feed. Similarly, the volume of follow-on communication (for example in the form of themselves non-hashtagged @replies to hashtagged tweets) usually remains outside the ambit of such studies.

Further, not all topically relevant messages exchanged on Twitter will be marked with an appropriate hashtag; the hashtagged macro level of communication therefore represents only the tip of an iceberg of communicative activity which extends much further down towards the meso and micro levels (and most likely beyond, into private, direct messages). Hashtag studies are able to determine how many hashtagged tweets about a given event or topic were exchanged at any one time—but how many more tweets about the topic, without hashtags, reached only meso-level audiences or engaged with specific @reply recipients at the micro layer?

The bulk of the iceberg is likely to substantially outweigh the tip, in most cases (but is also considerably more difficult to delineate with any degree of exactness): over a period of five days following the March 2011 tsunami on the Japanese east coast, for example, we captured some 790,000 tweets containing the hashtag #tsunami, but close to four times as many tweets simply featuring the *word* 'tsunami'—and even this does not begin to take into account the additional number of topical tweets which happened not to use either hashtag or keyword, but referred to the disaster in other terms or languages.

Correspondingly, studies of Twitter use during election campaigns have shown how key politicians such as major party leaders only show up in hashtag-based datasets when other users tag these leaders' tweets, i.e. when users transition the tweets from the meso to the macro layer of communication through retweeting (e.g., Moe & Larsson 2012). The extent and character of these party leaders' overall tweeting activities largely remains obscured in these studies, therefore.

Methodologically, it is considerably more difficult to move beyond the relatively well-behaved confines of macro-layer hashtag studies. Suggested options include collecting tweets from a pre-defined set of users (e.g., Benney, 2011; Sæbø, 2011; Vergeer, Hermans, & Sams, 2011), or archiving based on keywords (Tumasjan, Sprenger, & Sander, 2010). While the first approach captures communication across the layers *from* a population, it misses any communication *to* the users, as well as retweets of their messages. The latter option, while not being explicitly tied to hashtags, by and large has the same limitations as outlined above. To study public interactions on the meso layer, researchers would need to scrutinise the interactions of all the followers of one or more identified user(s), potentially adding up to a very large number of users to track, and thus exceeding the usage restrictions of the standard Twitter API (necessitating the use of costly third-party services providing access to Twitter data on a larger scale) (but cf. Gaffney & Puschmann, Chapter 5 of this volume). To examine micro-level interactions through @replies, research tools which reliably capture all @reply interactions between two or more identified users must be developed. In turn, the observations made at the micro or meso layer of communication must be integrated again with those at other layers, in order to avoid a repeat of the single-layer problem which exists with hashtag studies.

Finally, the specific communicative context of the phenomena to be studied must also be taken into account. Micro, meso, and macro layers may play considerably different roles depending on the particular groups of Twitter users who use them to communicate, to the point that for users with a very large fol-

lower network, the layer order reverses: for a Lady Gaga or Barack Obama, for example, the audience constituted by their followers is likely to be much larger than that made up of the participants and followers of almost any hashtag imaginable. This does not mean that hashtags lose their inherent utility, however; by contrast, a single tweet from such leading Twitter users can be instrumental in publicising the existence of a given hashtag, resulting in a substantial influx of new followers and participants. (This was demonstrated most clearly by the successful, celebrity-centred campaign to publicise the #kony2012 hashtag.)

Such vast follower networks around specific celebrity users already provide their focal accounts with a (meso-layer) Twitter reach which rivals that of the most popular hashtags. Yet, the (macro-layer) audience for hashtags remains less predictable, less unified by shared interest in a specific, leading Twitter user; more multidirectionally interactive; and more changeable. Anyone can subscribe to a hashtag feed, or contribute by posting hashtagged tweets. As the most open and flexible layer of communication on Twitter, then, it makes sense to continue to consider hashtag exchanges the macro level of communicative activity on Twitter.

This threefold conceptual model, stretching across micro, meso, and macro layers of communication, is crucial for an understanding of Twitter both from a practical perspective—from the view of the user attempting to communicate with others through Twitter—and from a scholarly perspective—in order to place observable phenomena on Twitter in the wider context of the full range of communicative activities which take place on the platform. It is important to note here that the model deals only with *public* communication *on Twitter*: in addition to the three layers we have outlined here, there is a further, still lower layer of private communication through direct messaging on the platform itself, as well as through any other forms of private interaction which may be available to any two Twitter users; similarly, there are additional layers of public communication outside of Twitter which, due to the embedding of the Twitter platform into the wider media ecology, are interwoven with communicative processes on Twitter itself.

To fully understand information flows not just *on*, but *through* Twitter as a communicative tool, these outside layers must also be taken into account. During the 2011 south east Queensland floods, for example (cf. Bruns & Burgess, Chapter 28 in this volume), situation updates for the central crisis response steering group were disseminated—hashtagged and in real time—through the Queensland Police Service’s (QPS) Twitter account, copied from there to the live tickers of mainstream news channels, posted back to Twitter by viewers of

these channels (or retweeted directly from the QPS account), and eventually passed along in person through local neighbourhood networks. Information flows weaved in and out of Twitter, and across the three communicative layers, multiple times. To examine such complex processes of information dissemination only from the perspective of any one layer, or even of any one medium, is to miss an important dimension of their communicative dynamics.

The argument we are making, then, is that while the three layers we have outlined here can be understood in part as determined by the specific technological affordances of Twitter as a platform, they also exist independently of it, and have their equivalents in many other forms of mediated communication. More by chance than by design, and due not least to the considerable influence of Twitter users in guiding their evolution, the communicative mechanisms which Twitter now offers its users are well suited for public communication in a variety of forms: from the comparatively intimate, one-on-one level of @replies through the narrowcast level of personal publics constituted by follower networks to the collective, diffused, many-to-many level of hashtags.

These levels do not simply stem from the underlying technological settings of the Twitter platform, then; rather, in fact, they have co-evolved with it, and sometimes persisted even against the pressures exerted by Twitter's management and developers. Put another way, these different layers of communication precede Twitter itself, and Twitter technology simply gives them concrete, if temporary, form. From this perspective, finally, communicative processes on Twitter also provide us with a glimpse of far more fundamental aspects of human communication.

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