Trending #hijabfashion: Using Big Data to Study Religion at the Online–Urban Interface[1]

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ABSTRACT

This article discusses the potential and the limitations of big data analysis for the study of religion. While big data analysis is often perceived as overtly positivistic because of its quantitative and computational nature, we argue instead that it lends itself to an inductive approach. Since the data are typically not collected for the purpose of testing specific hypotheses, it can best be seen as a resource for serendipitous exploration. We therefore pose a number of substantive research questions regarding the global circulation and local mediation of sartorial styles and practices among Muslim women. We present an analysis of the #hijabfashion hashtag on Instagram, drawing on a database of 15 million posts.

The analysis proceeds in two steps. First, we research the deterritorialized global networks formed by users who mark their posts with the hashtag, showing how hijabistas form relationships that cut across national, ethnic, and other boundaries. Then, we demonstrate how these global networks are underpinned and powered by localized networks, focusing on the case of Rotterdam. We show how hijabistas in this Dutch city develop their religious and fashion styles through localized agglomeration economies and counterpublics.

Keywords

Hijab, fashion, network analysis, big data, social media, Instagram

INTRODUCTION

The hashtag #hijabfashion is widely used by fashion-conscious Muslims as well as by entrepreneurs and businesses that cater to this specific market niche. The hashtag provides an entry into the world of hijabistas (a portmanteau of "hijab" and "fashionista") who use the hashtag to circulate images and messages to others in their networks. This article presents an analysis of the hashtag on Instagram and then proceeds to use the results of the computational analysis to map out a field site for qualitative inquiry. Our unique approach allows us to complement qualitative studies of hijab fashion that have been done to date. Extant work focuses on the role of sartorial styles in the negotiation of identity in various local (especially diasporic and migrant) settings (Read 2007; Furseth 2014) as well as evolving practices and economies around modest fashion (Tarlo 2010; Tarlo and Moors 2013; Lewis, 2013, 2015). Our focus here differs somewhat, in that we place local and global networks at the center of our analysis. Our research questions are: How do hijabistas constitute local and global networks of circulation? What accounts for how these networks form, and who and what is able to gain visibility in them? How is religious practice entangled with economic practice and identity politics in the posts indexed by this hashtag?

In posing these questions, we take up the suggestion put forward by Peggy Levitt (2012), among others, for scholars of religion to focus on linkages and circulations rather than bounded sites of religious practice. The works of anthropologists Emma Tarlo and Annelies Moors go in this direction by drawing on multi-sited research on Islamic fashion that includes both online and offline sites. By drawing data on a large scale from social media, we seek to understand more about how symbols, styles and discourses circulate globally and are negotiated locally.

This article furthermore seeks to demonstrate the potential and limitations of the analysis of "big data" in the study of religion. Several trends in the development of contemporary religion indicate that the analysis of large digital datasets will play an increasingly important role in the future. Scholars of religion and media have noted that religious practice often involves the use of media technologies, and that as these technologies increasingly become digital and connected to worldwide data networks, so does religious practice (Lövheim 2011; Meyer and Moors 2005; Lundby 2011; Hjavard 2015). For instance, megachurches frequently encourage congregation members to participate in worship services

using Twitter, Islamic scholars issue fatwas online, and religious adherents of all faiths around the world stay connected to their faith communities by "liking" Facebook pages or reading email newsletters. Many of these religious uses of digital media leave digital traces—many terabytes worth of traces. For instance, ministers who used to send regular circulars to their donors nowadays may simply run a blog instead. As a result, historians of the future hoping to learn about religious leaders, institutions or practices may no longer find archives of letters and other printed matter. Instead, in data centers and wherever else this kind of data will have survived, they will find digital archives containing hypertext, status updates and much more—and they will find large volumes of it.

This turn toward big data—which can be technically defined as unstructured datasets that are frequently tens of terabytes in size, but also, more broadly, as the deluge of data that become available as internet users leave digital traces—poses a challenge for established research methods in the study of religion, whether qualitative or quantitative (Wuthnow 2015: 203). Qualitative methods of analysis, such as content analysis or discourse analysis, either cannot make sense of such data at all, or are difficult to apply to data on a large scale. Quantitative methods, even if they can handle large datasets, generally rely on structured data with clearly defined variables, not the kind of unstructured data generated by users of digital media. New methods to analyze such large quantities of data are being developed, but only to a limited extent within the social scientific study of religion (Cantwell and Rashid 2015). While the literature provides a wide range of deep case studies and survey-based quantitative articles, few, if any, scholars of religion have attempted to use big data to study the uneven development of religion across geographical and media spaces.

One cause of the dearth of such studies may be that scholars in the human sciences are skeptical about the claims made by some advocates of a big data-driven approach to social inquiry, who claim that theorizing has become obsolete (Anderson 2008). While a number of articles have emphasized the limitations of big data in specific fields of inquiry (e.g., Manovich 2012; Mahrta and Scharkow 2013; Graham and Shelton 2013; Tufekci 2014), scholars of religion are perhaps especially predisposed to resist big data's siren call, as they tend to emphasize contingency, complexity, context, ambiguity, and polyvalence—all of which are easily lost when automated tools sift through millions of data points in search of recurrent patterns.

Nonetheless, we will make the case that there are potential gains, especially if big data analysis is combined with other methods, qualitative and interpretive methods in particular. We argue that big data analysis is suitable for tracing flows of circulation (Moors and Tarlo 2007b; McAlister 2005) and identifying the structures—the cores and peripheries—of global networks (Knott 2005). This is valuable in and of itself, and it also provides helpful information to identify, select, and situate local cases, which can—and indeed have to be—studied in greater detail to understand the mechanisms underpinning global processes. While big data analysis is often perceived as being associated with positivist epistemologies because of its quantitative and computational nature, we argue instead that it lends itself to an inductive approach. Since the data are typically not collected for the purpose of testing specific hypotheses, they can be seen as a terrain for serendipitous exploration. Although the idea that the abundance of data makes theory redundant (Savage and

Burrows 2007) is overstated, it will often be the case that big data provide something to work with in lieu of, and in anticipation of, a more robust theoretical framework.

This article first presents the approach and methods. It then shifts attention to the #hijabfashion global network. We show that the network is highly uneven, with a few users receiving the bulk of attention. Within the hijab fashion niche, these users are celebrities who function as role models, helping women navigate the contradictory demands of the social worlds they inhabit. The hijab is not only a frequent flashpoint in European moral panics about immigration, but is also contested within Islamic traditions and among Muslim women (Furseth 2011; Read and Bartkowski 2000; Read 2007; Lazreg 2009). The analysis also demonstrates that there are specific local centers where the number of #hijab-fashion posts is exceptionally high. In the remainder of the paper, we analyze one such center—Rotterdam—and illustrate how computational techniques can help map local networks in concert with qualitative techniques. Our conclusion summarizes the findings of our investigation of hijab fashion and reflects on the potential of big data analysis.

APPROACH AND METHODS

While big data analysis can be applied to a range of themes, we are specifically interested in geographies of circulation. We understand geography in a broad sense to encompass spaces both online and offline, physical as well as symbolic (Lefebvre 1991). Religious beliefs and practices are developed on the interface of these different spaces (Knott 2008; Campbell and Lövheim 2011). This implies that we should not conceive of the media as representing more or less accurately a reality that lies outside of it. This is especially important to keep in mind when studying Instagram, which is our primary data source for this paper. As of September 2017, Instagram had 800 million users (Etherington 2017), among whom younger generations and women are overrepresented (Greenwood et al. 2014). Instagram is known—is even infamous—as a platform where users showcase themselves in their most successful, happiest, and confident ways. We will not analyze these self-presentations as a more or less accurate representation of reality, but as a moment or aspect *of* reality. The Instagram posts are obviously important for the users who put time and effort into the pictures. They are potentially an important source of data for researchers, especially when we are interested in front stage practices like fashion. Instagram has become an important place for showcasing cutting-edge fashion, beauty and lifestyle trends (cf. Duffy and Hund 2015). It is a platform where users post and see carefully crafted presentations of who they are and what they represent. This makes Instagram an ideal platform to study how young women craft their self-presentations, navigate the worlds of religion and fashion, and negotiate the sometimes contradictory demands of their ethnic communities and society at large.

The hashtag #hijabfashion encapsulates what, for many, would be considered a contradiction: it merges Arabic with English and simultaneously conveys a stress on modesty (associated with the hijab) and appearance (associated with fashion). The posts indexed by the hashtag represent a global reservoir of images that individual users can draw inspiration and ideas from as they craft their self-images and navigate their local environments. The

hashtag is therefore an interface between the online and the offline, the global and the local. We propose to use big data analysis to map geographies of circulation at both the global and the local level.

We look at three different types of network. First, we examine how some users on Instagram come to stand out among their Instagram peers. Researchers of hijab fashion have emphasized that celebrities perform important roles in displaying new styles (Tarlo 2010). Social media is not only an important channel of communication for celebrities, but also spawn their own class of niche celebrities, often called "influencers"—widely followed users who create content that is often both very intimate and very commercial (Senft 2008; Marwick 2014). Second, we examine global networks of #hijabfashion. Our analysis, again, tracks more qualitative work in this area, which points towards the importance of specific global cities, including Istanbul and Jakarta, in driving innovation in fashion design and advertising. Our methods allow us identify major hubs of activity as well as their connections (Bruggeman 2008). Third, we look at two dimensions of local networks. One dimension is economic: hijab fashion is a major industry in which some local centers perform critical roles. The other dimension is political. We suggest that these local networks can be considered as counterpublics (cf. Fraser 1993) in which hijab fashionistas negotiate the adoption, adaptation or contestation of certain sartorial practices and products as part of ongoing debates on the personal, the political, and the spiritual (cf. Moors and Tarlo 2007a). It is in this sense that fashion is a vehicle to work through moral, aesthetic and political demands.

To map the global #hijabfashion phenomenon, we collected 15 million #hijabfashion posts over a half-year period, between 1 September 2015 and 16 March 2016. In addition, we collected the metadata of these posts, including place tags, coordinates, comments, and "likes." The place tags and coordinates can be used to locate #hijabfashion activity. The comments and likes can serve to draw up a network graph: we assign a tie between users (represented as nodes) when they express appreciation by clicking the "like" button or leaving comments. To map the local networks through which sartorial practices and products circulate and transform, we zoomed in on the city of Rotterdam. Since this city showed up in our analysis as one prominent metropolitan node in the global #hijabfashion network (see Table 1 below) and we are based close to Rotterdam, we selected this city to complement our analysis of the global network with more close-up observations of local networks.

Table 1 Number of geotagged posts by place

City or Region	Country	Posts	Users	City or Region	Country	Posts	Users
Jawa Tengah	Indonesia	20539	1739	Lampung	Indonesia	376	181
Daerah Khusus Ibukota Jakarta	Indonesia	8334	1932	Riau	Indonesia	373	187
Jawa Timur	Indonesia	5967	2119	Pekanbaru	Indonesia	331	116
Jawa Barat	Indonesia	5801	2584	İzmir	Turkey	325	54
İstanbul	Turkey	3035	456	Palembang	Indonesia	285	149
Daerah Istimewa Yogyakarta	Indonesia	2852	1174	Bursa	Turkey	277	44
Bandung	Indonesia	2260	490	Shah Alam	Malaysia	275	83
Sulawesi Selatan	Indonesia	1947	701	Semarang	Indonesia	271	173
Banten	Indonesia	1481	739	Pontianak	Indonesia	267	99
Kuala Lumpur	Malaysia	1473	268	Bengkulu	Indonesia	263	96
Selangor	Malaysia	1247	236	Aceh	Indonesia	262	145
Sumatera Utara	Indonesia	947	325	Bogor	Indonesia	257	158
Kalimantan Selatan	Indonesia	752	196	RW 01	Indonesia	248	171
Surakarta	Indonesia	655	160	Ankara	Turkey	247	51
Sumatera Barat	Indonesia	567	255	Nonthaburi	Thailand	238	1
Jakarta	Indonesia	548	389	Makassar	Indonesia	235	147
Timbau	Indonesia	516	5	Sumatera Selatan	Indonesia	212	137
Cairo	Egypt	510	101	Surabaya	Indonesia	209	123
Bali	Indonesia	468	222	Kalimantan Barat	Indonesia	183	85
Singapore	Singapore	429	173	Melbourne	Australia	178	30
Depok	Indonesia	427	68	Johor Bahru	Malaysia	176	52
London	United Kingdom	421	133	Malang	Indonesia	171	112
Bekasi	Indonesia	418	176	RW 11	Indonesia	170	15
Dubai	UAE	417	113	Rotterdam	Netherlands	165	21
Jambi	Indonesia	397	133	Cimahi	Indonesia	162	69

In addition to these quantitative and network analyses, we also rely on field research in Rotterdam. This article's third author visited stores and events with a strong presence on Instagram, conducting interviews with seven women involved in hijab fashion as entrepreneurs, designers and store employees, and holding informal conversations with numerous women attending hijab fashion events. She introduced herself as a university-affiliated researcher and found that most women were eager to tell their stories and felt honored to be the subject of research. During these conversations, the women shared their ideas about and experiences of the world of hijab fashion. They talked about what they considered to be appealing styles and how they interpreted religious precepts for clothing. The interviewees also discussed business relationships between mainly Istanbul-based suppliers and Rotterdam-based fashion entrepreneurs, as well as the relationships among Rotterdam's boutiques and beauty parlors. We thus use the interviews to obtain insights into Instagram micro-celebrities, the local and global circulation of images and styles, and the discussions on the meaning of the hijab in the women's personal lives and society at large. We learned from women working in boutiques about different ways of building a following and thus contacting possible customers. The interviews and observations thus shed light on the contexts in which Instagram images are produced, seen and debated.

#HIJABFASHION CELEBRITIES

Although social media offer unprecedented opportunities for horizontal communication (Castells 2012), researchers have found that social media networks are uneven in practice, with a few users receiving the bulk of attention (cf. Zhu and Lerman 2016). We also found that the distribution of attention in the #hijabfashion world is highly unbalanced; Figure 1 shows the distribution of followers among accounts in the #hijabfashion network. The vast majority of Instagram users who tag their posts with #hijabfashion have only a few followers, while a couple of accounts have follower numbers in the order of several hundreds of thousands. This suggests that the #hijabfashion symbolic universe, like other social media phenomena, is highly unequal. Some users stand out strongly. The top 50 users combined have more followers than the bottom 20,000 users combined. If we use the Gini coefficient, usually applied in studies of income inequality, to the distribution of followers, we return a value of 0.82.
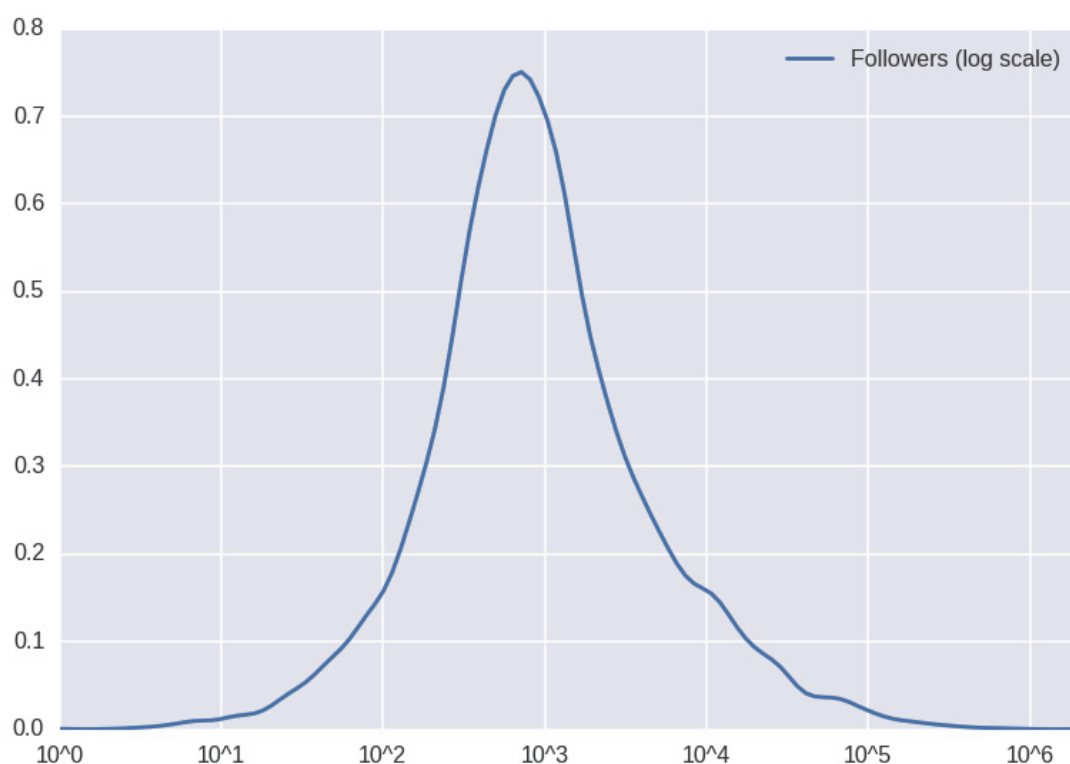

Figure 1 Distribution of follower numbers among 24,490 Instagram accounts in the #hijabfashion network with at least three likes or comments. The x-axis progresses in orders of magnitude. The follower numbers have been obtained for all users in the global #hijabfashion network who received three or more "likes" or comments on their posts.

Browsing the top accounts, it is striking that they owe their fame to their social media activities. This is remarkable, because often a high number of followers on a platform is simply a reflection of overall media prominence. The pop star Beyoncé, to provide one example, is very popular on Instagram, but she does not owe her fame to this platform. In

contrast, top hijabistas by and large owe their fame to Instagram and other social media platforms like YouTube or Facebook. They are fashion outlets, stylists, designers, students, housewives or professionals who have amassed huge followings on Instagram because they display and embody hijab fashion in appealing ways. Though some metropolitan regions and countries are over-represented (see below), the overall impression is that of a truly global and cosmopolitan phenomenon. As one illustration, the Montreal-based account @hijabfashion (the highest ranking account in our database, with almost two million followers) displays pictures of women based in Dubai, Chicago, Izmir, Toronto, Paris, Casablanca, Rotterdam, Miami, Kuwait, and Manchester, among other places.

Within their specific niches on the web, the top users can justly be called celebrities: their posts quickly accumulate tens of thousands of "likes," and they have sizeable fan bases with follower numbers in the hundreds of thousands. This is not to say that their posts are without controversy. Models in the pictures occasionally receive criticisms in their posts' comments sections, especially when their outfits are deemed immodest or *haram*. However, most of the time these models are praised because of their style, sincerity, elegance, modesty, or beauty.

While their fame originates from their activities on the web, it also carries over in to offline settings. For instance, the Instagram user Seymatje, a Dutch woman of Turkish descent with over 270,000 followers, occasionally gives talks or attends fashion events. The announcements (in Turkish) sometimes describe her as an "Instagram *fenomeni*." These women are not just models; they are also *role* models, as they help their followers navigate the many, often contradictory demands from their communities and broader society. They mostly do so through images: they visually demonstrate how to balance piety and attractiveness, tradition and fashion. The 22-year-old Ruba Zai, a Dutch model of Afghan descent, became an established figure on YouTube through her instructional videos on how to wrap hijabs and more generally "look and feel great," as she says on her website. Her Instagram account, with over 600,000 followers, mostly features pictures and a couple of short clips featuring (sponsored) fashion items. Her blog almost exclusively features images, but she occasionally writes about how the mundane practices of putting on make-up, selecting clothes or choosing hijab styles are part of a balancing act: "As a young woman, living in 'The Wild West' it can be hard to find the perfect balance between faith, fashion and society. That's why I like to inspire other girls who are trying to find their way in life, like I am. I like to show that the way people think about muslimahs is so old-fashioned. Nowadays, hijabistas are trending all over the world."[2] Ruba Zai describes this search for balance as a "journey" as she cultivates a personal style. Appearance is one key topic of debate in the various spaces that make up the #hijabfashion world, as women engage in ongoing conversations on how they present themselves. As Moors (2011: 177) notes, Georg Simmel described the dual pressures involving fashion as a "socializing impulse" and "differentiating impulse," and argued that they are specific to modern industrial cities. Though the cross-pressure to simultaneously communicate individuality and belong is a general feature of modern society, it manifests in unique—and perhaps uniquely complex—ways for hija-

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2.   http://www.rubazai.com/about (accessed on 18 April 2016)

bistas, who often balance contradictory demands. The journey Ruba Zai talks about and the constant positioning Simmel discusses both involve profound spiritual and political questions: How to reconcile modesty and piety, on the one hand, and looks and distinction, on the other? While these questions are undoubtedly thought through and discussed in the abstract, they also have to be confronted in how one conducts and fashions oneself: How to wrap the hijab? Which make-up is permitted (*halal*) and which is not (*haram*)? For instance, an entrepreneur who sells hijab fashion notes that many of her customers and friends struggle with finding the right style:

> Yes, they want to wear it the Turkish or Moroccan way, but they are afraid. The way of wrapping the hijab, to change this is hard, very hard for them. People will comment on Turkish girls who wear their hijab in a Moroccan way, comments like, "You want to be Moroccan or look Moroccan." Yeah, something like this, they will have a lot of comments about it. So they change the way they wear the hijab step by step, not all at once. Just little steps, really little. Yeah, it is difficult for them, really difficult.

The models help to answer these questions. They are mediators who seek out new styles and communicate them to their followers through images and instructional videos on YouTube or Instagram. Entrepreneurs operating in new niche markets for non-traditional clothing do not only offer particular styles but also demonstrate, sometimes very practically, how to adopt new fashion habits. Sadoq is a fashion brand based in Amsterdam. It is retailed exclusively out of a Rotterdam boutique. The owner told us "Sadoq makes hijabs out of bamboo, which makes the way of wrapping and wearing them differ from more traditional ways. Without magnets and pins. Loubna, the designer behind Sadoq, organizes evenings for women to help and show them how to wrap this hijab."

Here we see how new styles are invented, diffused and implemented through a localized network of users. While hijab fashion styles incorporate influences from all over the world, this localized network is underpinned by close and personal relationships. As the store owner explains: "Ruba Zai wore Sadoq and knows [Loubna, the designer]; I came to be acquainted with Sadoq through Ruba Zai. Because Loubna does not respond to all the messages she gets, you really need to know her or get introduced to her by someone she knows. That is the way things go, yeah."

These quotes and observations give insight into part of a local cluster that mediates global fashion trends. They incidentally also demonstrate that these dynamics are not merely cultural or political, but also economic: hijab fashion is not just lifestyle but also business for the models, the shops, the designers, and the retailers. Muslims around the world spend in excess of US$ 266 billion on fashion per year (Thurman 2016).[3]

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3.   Like Ruba Zai, many hijabistas use Instagram and other platforms for commercial purposes, e.g. by picturing themselves with products to promote or sell. Very popular instructional videos on YouTube may generate some revenue, since YouTube shares ad revenues with users (NPO 2015; Postigo 2016), but otherwise it is unlikely that users make money from the platforms themselves. The platforms are sites of commercial activity, but in the #hijabfashion world, we see little evidence of their being economic players in their own right.

THE GEOGRAPHY OF #HIJABFASHION: GLOBAL NETWORKS

To further map some of the global flows underpinning the #hijabfashion phenomenon, we used "likes" and comments to establish relationships among users. When one user likes or comments on the post of another user, we assume they have a relationship (which in network parlance is called a directed edge between two nodes). To determine the geographical location of users, we used the location of their posts. While only 5.2 percent of posts in our #hijabfashion collection are geotagged, this still provides us with 84,001 geotagged posts. These posts are tagged with about 25,000 unique sets of coordinates, which we reverse geocoded to situate posts in cities and countries. If users' posts had only one set of coordinates, that point would be taken as their location. If they had more than one, we applied a technique called affinity propagation clustering to the collection of coordinates and took the largest spatial cluster to be where they are based.
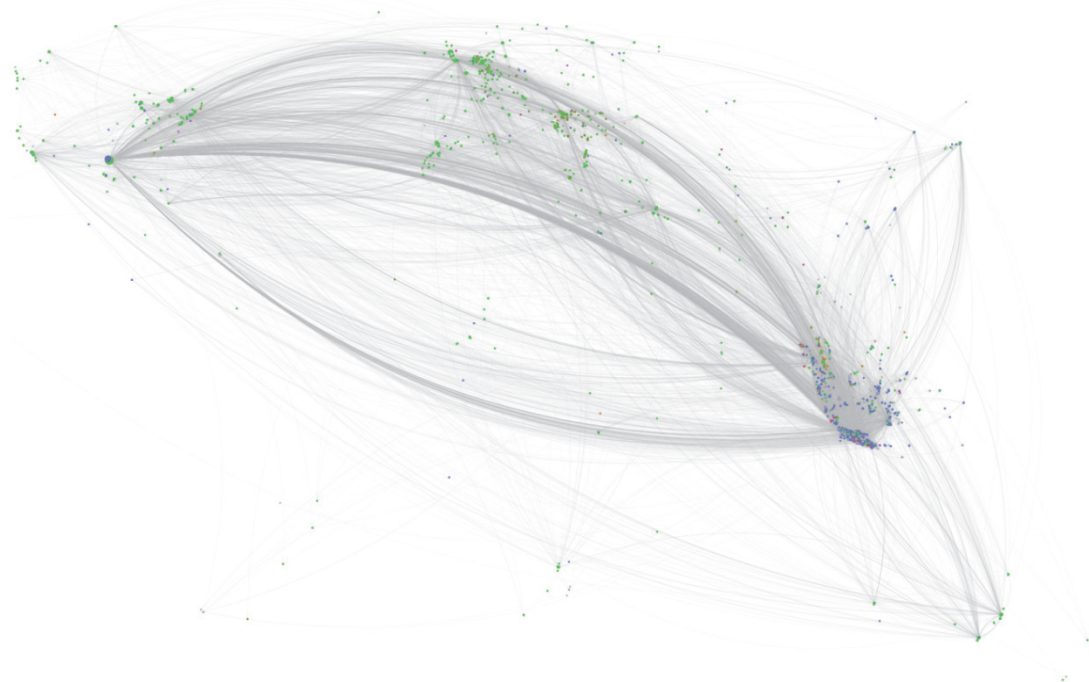

Figure 2 Ties among Instagram users who use the #hijabfashion hashtag. See main text for how users, locations, and ties were inferred.

Figure 2 depicts three main clusters of nodes with relatively dense relations.[4] It shows one large cluster with a center of gravity in Indonesia, one large cluster with participants based in Western countries, and one much smaller, geographically dispersed cluster.

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4. These clusters are identified with a technique called community detection (we used the Louvain technique implemented by the software tool Gephi). We used a high-resolution parameter to identify a smaller number of clusters. If we had used a lower parameter, we would have obtained a larger number of communities, which is less useful for the general analysis we perform here.

What perhaps stands out the most, however, are the intense international flows: this really is a global network, with relationships cutting across the boundaries between countries, regions, and cultures (Western or Southern, Islamic or non-Islamic). The graph further demonstrates that some central users within the network are in places where one may not expect them. For instance, Texas has a few particularly prolific users who receive likes and comments from around the world. While the graph immediately draws attention to concentrations of activity, it also helps to locate anomalies. For instance, we found one user in Minsk. Although she is isolated in the sense that she is the only user in Belarus in this network, she is strongly integrated if we consider the global network as a whole; she has many connections and her pictures convey a style many hijabistas refer to and promote as "hijab chic," combining Islamic dress with exclusive brands. Examples like this suggest that hijabistas find peers and role models in the global #hijabfashion network that they may lack in their own local environments. To a degree, the network is "deterritorialized" (Roy 2006): while regional variations remain—for instance with respect to wrapping style—the women are participating in global networks, collaboratively developing and using vocabularies to express their religious adherence and sense of style.

THE GEOGRAPHY OF #HIJABFASHION: LOCAL ECONOMIC NETWORKS

However, the global diffusion of styles and vocabularies reconfigures rather than negates the significance of local networks. For instance, within economic sociology and economic geography, much attention is devoted to agglomeration economies (Storper 1997; Scott 2008). There appears to be consensus that proximity is very important to reduce transaction costs, develop relations of trust, and access information quickly. Such agglomerations are important for spurring innovations in a range of different fields, including, we would argue, Islamic dress. Developing and adopting a style that conforms both to the demands of high fashion and of religiosity is a complex process of mediation, innovation, and negotiation (see also Tarlo and Moors 2013) that thrives on the types of local relationships described by economic sociologists and geographers. In other words, just as in other branches of fashion (see e.g. Scott 2002; Rocamora 2009) and in other industries (Storper 1997), we would expect to find certain hotspots or fashion capitals with particularly intense and innovative activity.

As a first step towards identifying such local networks, we list the cities where most posts with the #hijabfashion hashtag originate. Table 1 shows that Indonesia is by far the biggest producer of #hijabfashion posts, with Malaysia and Turkey as runners-up. According to this analysis, the worldwide capitals are Jakarta, Istanbul, Kuala Lumpur, Cairo, and Singapore. It is perhaps instructive to compare this list (constructed with imperfect data and without prior knowledge of the field) with a list provided by Moors, who claims that "places such Beirut, Cairo, Dubai, Dakar, Kuala Lumpur, and Jakarta" had emerged as "new fashion centers" (Moors 2011: 178). While she mentions two cities that are not on our list of the fifty most important #hijabfashion cities (Beirut, Dakar) and does not mention one that does appear at the very top of our list (Singapore), the similarities between the lists (Cairo, Dubai, Kuala Lumpur, and Jakarta) are striking. Moors goes on to mention that

cities in the West are latecomers with respect to Islamic fashion, which is in line with our findings. There are only a few Western cities in the top: London (421 posts), Melbourne (178 posts), and Rotterdam (165 posts). If we take the number of posts as an indicator, Rotterdam is the continental European capital of #hijabfashion, followed by Europe's fashion capital Paris.

Prima facie evidence hints that there may be an agglomeration in Rotterdam: we find many small and independent enterprises that cater (not necessarily exclusively) to the hijabista market. Our Instagram data enable us to map some aspects of this economic space. For instance, we found that there is an agglomeration of enterprises focusing on different aspects of style and fashion (see Table 2). In addition, we found that Rotterdam has a number of high-profile Instagram users who display hijab fashion: Seymatje with over 200,000 followers, Ruba Zai with 600,000, Huyla Aslan with 500,000, Fetos with 100,000, and the boutique Asude Moda's account, with a timeline filled with pictures featuring its store owner, has close to 100,000. The follower numbers are on par with those of Dutch celebrities who appear on television night after night. Although Rotterdam has a fairly large Turkish community (around 45,000 in a population of around 600,000), these women draw the lion's share of their followers from outside the city. There is, apparently, something that makes Rotterdam a particularly fertile environment for hijab fashion icons and enterprises.

Table 2 Places tagged with #hijabfashion in Rotterdam*

Asude Moda	Fashion	200
Ayza Butik	Fashion	147
Asmina Beauty	Make-up	149
Elit Mode	Bridal fashion	85
Pink Me Up Studio	Make-up	47
Elegance Boutique	Fashion	46
Bella Boudoir	Make-up	75
Celine Hair Fashion	Hair dresser	46
Ela Living	Interior design	24
Meram Rotterdam West	Restaurant	21
Be Pretty Boutique	Fashion	18

* Note that place tags are not the same as geotags. This explains how the number of place tags is different from (and much higher than) the number of geotagged posts reported in Table 1.

Our interviews suggest that there are interdependencies among these different enterprises. The density of hijab fashion specialty stores provides coverage and diversity. For instance, women might have their hijab wrapped in one place, buy a robe in another, and attend a henna party in yet another place. In such cases, the enterprises each carve out their own niche and, in aggregate, improve what Rotterdam has to offer. There is some evidence of

coordination among shops. For instance, one shop owner told us that she travels to Istanbul with the owner of another store. There, they decide what one or the other will import and subsequently sell in Rotterdam. However, the shopkeeper also emphasized that so many new enterprises have sprung up that it has become impossible to coordinate. Moreover, large department stores like H&M also offer competing fashion items for prices lower than she could ever offer. As a result, enterprises are attempting to specialize. One storeowner negotiates with her Istanbul retailers that they only supply to her so that she remains exclusive; when a retailer broke the deal, she ended the business relationship immediately. Another storeowner purchases her products from Istanbul suppliers but actively tries to reach beyond the Turkish market by commissioning the services of a well-known hijab model, the aforementioned Ruba Zai.

These examples illustrate how entrepreneurs, pushed by competitive pressures and aided by local networks, expand to markets beyond Rotterdam's Turkish community. Social media in general, and Instagram in particular, are key to achieving this. All the shops use their social media accounts to exhibit their products to remote customers, and they often provide detailed information on how to order, the store's refund policy or EU-wide shipping costs. The stores service the Dutch market, but increasingly the German and Belgian markets. This should not be taken to mean that the stores' location is irrelevant. Local relations of competition and cooperation have pushed them to offer products in niche markets that are in demand internationally. As we explained, Rotterdam is among the places where continuous processes of mediation and adaption generate new styles and combinations, giving Rotterdam's shops an edge in the international market place (even though Rotterdam's significance pales in comparison with Istanbul or Jakarta). What we see is a combination of "global pipelines" and "local buzz" (Bathelt et al. 2004). Social media enables the stores to reach beyond local markets. This involves much more than simply putting up a picture on social media. The entrepreneurs choose their models, locations, and accessories with great care. Observing fashion shoots and studying entrepreneurs' Instagram accounts shows that a lot of cultural, economic, and social capital goes into the staging of pictures. This is all the more important given that the actual shops and their surroundings are ordinary and unremarkable. Instagram enables these shops to project an image of elegance and glamor.

This analysis of economic relations surrounding #hijabfashion is not exhaustive but provides just a few additional perspectives on a growing phenomenon. While the data give us reason to assume that an economic cluster exists in Rotterdam, they tell us little about its structure and dynamics. Researchers can use big data to get a sense of where the action is. Rotterdam is important within the Netherlands and even internationally. The analysis further provides clues about the main players around hijab fashion in Rotterdam. The city occupies a special place in global hijab fashion networks and is a site for further inquiry, including local enterprises, but also—and perhaps more importantly—social media celebrities who showcase and assemble new styles.

THE GEOGRAPHY OF #HIJABFASHION: COUNTERPUBLICS

Local networks are important not only for economics, but also for politics. For instance, geographers have drawn attention to the spatial substrate of so-called counterpublics (Nicholls and Uitermark 2016). The concept of counterpublics was developed by Habermas's critics, who argued that subaltern groups develop institutions of their own to stage debates (Negt and Kluge 1993; Fraser 1993; Warner 2002). In such institutions—including bookshops, periodicals, study groups or community organizations—subaltern groups develop a sense of their place in society, and they do so on their own terms. While in the public sphere, subalterns' distinctive traits are stigmata (e.g., being a woman, being black, or being gay), this is not the case within counterpublics, in which stigmatized identities are foundational. Counterpublics are beyond the gaze of mainstream publics, and therefore serve to bolster the identity of subaltern groups and to infuse that identity with positive emotion. This, of course, does not mean that conflict is absent. In the case of hijabistas, the women discuss, sometimes acrimoniously, what is pious, modest or beautiful. Such counterpublics are underpinned by places where veiled women discuss their place within society. While such a counterpublic is separate from the mainstream public, the latter is always present in the background and forms an implicit or explicit point of reference. Castells, in particular, has emphasized how social movements, and by extension counterpublics, create spaces online and in cities (Castells 2009, 2012). Instead of viewing the #hijabfashion hashtag and these accounts as a separate "virtual" world disconnected from "the real world," we would be better off viewing counterpublics as urban/online interfaces. These counterpublics involve blogs, social media networks, henna parties, reading groups, restaurants, and so on. In all these different online and urban environments, hijabistas come together in what sociologists call interaction rituals: they share a mood, have a mutual focus, and infuse symbols (including, but not limited to, the hijab) with meaning and emotion. We can find the traces of some of those interaction rituals on Instagram as users post their pictures.

Instagram data are thus useful for a first-cut analysis to identify a counterpublic. Instagram users can attach a place tag to their post. Using these place tags, we can draw up a list of places tagged by Rotterdam Instagram users who use the #hijabfashion hashtag. We can further infer connections among these places by assigning a tie between places when they are tagged by the same user. The resultant network is pictured in Figure 3. We should be cautious in interpreting the network, as hijabistas do not tag all places they frequent. For instance, we know that many of the women attend mosques and religious centers (one hijab fashion fair we attended was held in such a religious center and served as a fundraising event for the adjacent mosque), but these places are rarely tagged. While we need to keep in mind that we see only a small and select part of the network, it nevertheless provides us with a first impression.
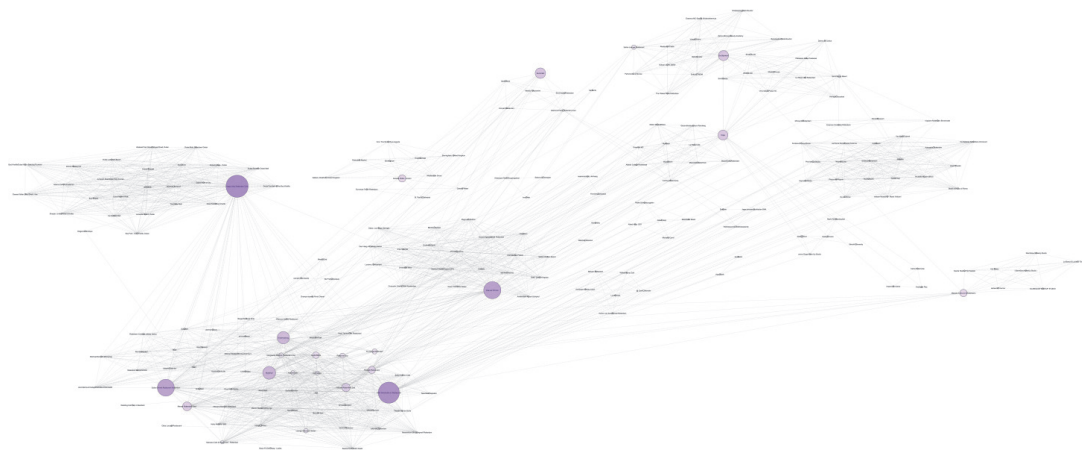
Figure 3 Local network of tagged places in Rotterdam. Nodes are places, ties indicate that places are tagged by the same user. Node size corresponds to betweenness centrality. The big node in the top left is the Italian restaurant Happy Italy. The two bigger nodes in the top right are Bijenkorf (a well-known department store) and the Turkish restaurant Köşk. Towards the bottom on the right we find the Turkish restaurant Mahzen. Towards the bottom left, we find a number of places with a Turkish signature, including OBA Grand Cafe and Sultan Ahmet Restaurant.

First of all, it is striking that Turkish-styled places are the majority and are central to this Instagram network of hijabistas, but the network also comprises widely known Rotterdam icons like Central Station, the Erasmus Bridge, or the Bijenkorf department store. While a typical representation of Rotterdam's places would have these icons at the center and the Turkish places to the margins, in the local #hijabfashion network this order is reversed. It is not that these women live in "parallel worlds" apart from mainstream society, but they do appear to inhabit worlds with different centers. Second, the picture shows that the local network is not so local, as there are a number of international places tagged by users. These include Abu Dhabi and Istanbul, but we also see tags for German Christmas markets. Third, there are places that play an important role in holding the network together. In the parlance of network analysis, such places would be considered brokers in the network. While we found that fashion and make-up stores were most frequently tagged (see above), restaurants are tagged by users located in different parts of the network. Our field work confirms this: entrepreneurs may or may not have direct contact, but they encounter each other in restaurants when they happen to come there in different groups or when they jointly attend festivities, such as weddings, taking place there. As noted, the network provides a first impression of the hijab fashion counterpublic; it gives a rough idea of the structure of the places that are meaningful enough to warrant a place tag, the degree to which these places group together in distinct clusters, and the connections that hold these clusters together. As such, the network representation provides a map allowing researchers to navigate the field.

CONCLUSION

Scholars have recognized hijab fashion as a site of identity formation as well as a lively economic niche from which new sartorial styles and practices spring forth. This article has sought to expand understanding of the world of hijab fashion by investigating networks that assemble sartorial styles and practices at various scales. This led to three insights into the ways global circulation and local mediation play out in the world of hijab fashion.

First, our findings point to the importance of (micro-) celebrities in the world of hijab fashion. These are young women who owe their visibility and fame to the ecology of social media platforms on which they have been able to amass sizeable followings. As role models, these young women guide other women of faith in matters both spiritual and mundane. While they owe their fame to their online activities, these women often have a presence offline as well, be it as models for local stores and brands, or as business and community leaders. Further research could illuminate the pressures these women face as they engage in the demanding work of building and keeping a social media following while embodying ethical and beauty ideals.

Second, mapping the global spread of #hijabfashion revealed that, although there are regional clusters, users overwhelmingly participate in a global exchange. Even women that appear geographically marginal, such as hijab fashion bloggers based in a Texas suburb, are anything but marginal once we take their linkages to others around the world into account. It would be fruitful to investigate how such relatively isolated individuals perceive the wider web of relationships. Do global linkages lead to demarginalization, or do they perhaps even accentuate a sense of alienation?

Third, despite the global reach of #hijabfashion, the phenomenon is underpinned by local relations. Our data allowed us to identify capitals of hijab fashion and, by way of an analysis of Rotterdam, show how networks of local entrepreneurs (such as stores, models, and designers) generate "local buzz" while tapping into "global pipelines" (Bathelt et al. 2004). In addition to economic agglomerations, the data also allowed us to identify the spatial substrate of a local hijab fashion counterpublic that constitutes not a world apart, but a world with different focal points from those frequented by mainstream urban dwellers. These focal points are often staging grounds for fashion displays, for instance on festive occasions. Additional fieldwork in localities around the world could help illuminate further how coordination, competition and solidarity in local settings shape sartorial practices and women's identities.

Our aim in this paper was to explore the utility of big data for the study of religion. Our data and methods have proven particularly useful to our aim of mapping processes of circulation and contact. While we cannot rely on big data and computational methods alone to interpret, explain or understand what happens in "sites of encounter" (Levitt 2012: 160), they can help to identify those places of encounter and to gain a sense of how actors around the world partake in global and local networks. More could be done with these data. We have relied on our own interpretations to understand the meaning of social media posts, but the advance of techniques for semi- and fully automated content analysis creates opportunities to use computational analysis to aid interpretation (Stemler 2015; Manovich 2016). This article has provided a preliminary account of how big data might be appropri-

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ated in the study of religion. Big data usually offers rich, yet biased and incomplete data that should be combined with additional sources to understand the complex relations of which social media are but one aspect.

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