Twitterbot Surveys:
A Method for Magazine
Audience Analysis

by

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Abstract

The purpose of this study is to explore automated surveys on Twitter as a method for magazines to analyse their audiences and identify best practices for conducting the surveys. To do this I conducted a pilot survey with Twitter users who shared a *New Yorker* article. I tested the response rate of twelve different question variants looking at question type, type of appeal to respondent used, and whether the tweet was sent as a @reply or @mention. The results showed the survey as a whole had a 23.2% response rate. I found a multiple-choice question, appealing to the respondents' ego sent as a @reply generated the highest response rate at 40.0%. The results of this pilot survey show the viability for this method to provide magazines with access to their audiences. It suggests this method may provide magazines with timely and efficient access to audience insights.

Keywords: magazine publishing; social media; survey methodology; audience analysis; Twitter

Acknowledgements

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Chapter One: Introduction

As the publishing industry changes to adapt to shifting publishing and media consumption paradigms, magazines are faced with new challenges to remain profitable and relevant. At the same time, they are presented with new and innovative tools through the internet. In order to stay relevant, profitable, and consistent in how they present themselves, magazine publishers have always needed to define who their intended audience is, who actually reads the magazine, and how to reconcile the two. This may involve understanding where readers like to shop, what products or events they are interested in, and what drives them to the content they consume, etc. Such details allow magazines to target their audience more effectively, appeal to them, capture a segment advertisers are interested in, and above all, remain financially solvent. Magazines have traditionally captured this in a number of ways including an annual reader survey and through in-person interactions at events. In the past decade, they have been able to turn to website analytics tools, such as Google Analytics. Interviews and surveys have been useful tools that can yield the desired audience analysis but are often time consuming and costly and provide an intermittent and incomplete snapshot of the target audience.

The internet has forced changes on the magazine industry, some positive, such as the increased access to user analytic information, others challenging, such as the decreases in advertising revenue and newsstand sales. This has simultaneously created in the magazine industry a need to be adaptable and flexible in dealing with rapid industry changes and access to more information and data potential than ever before.[1] This can be seen as a need for magazines to optimize their operations as much as possible, something that can be achieved if a magazine understands for whom they are producing content and who actually reads the magazine. With such information they are then able to make better decisions regarding the editorial

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[1] David Karpf, 'Social Science Research Methods in Internet Time', *Information, Communication & Society* 15, no. 5 (1 June 2012): 639–61, doi:10.1080/1369118X.2012.665468.

direction of the magazine, current and future advertisers and sponsors, and the most appropriate marketing and publicity strategy. This continues to become more important as industry and technological pressures increase, requiring a more financially streamlined and efficient magazine.

As magazines make a transition from being primarily a print medium to having a significant digital presence, the ways in which publishers conduct audience analysis also change.[2] When the readers move online, all of the digital traces users left from number of clicks to scroll-depth on a given webpage become accessible in one form or another. Tools that gathered this information, such as Google Analytics, make it possible to investigate an entirely different dimension of an audience's behaviour, such as the length of time spent on an article and the exact location within a web page where users abandon the article. Though these analytic tools provide a wealth of information that was previously inaccessible, its use is still limited because they do not provide explicit data[3] from users, but rather aggregated, anonymous data. Google Analytics provides information such as user demographics, how they are interacting with the website, what terms they are searching for, etc.[4] It does not, however, provide insight into why users make the choices they do or what their underlying motivations or feelings may be when interacting with a magazine. To probe that kind of information, it is still necessary to interact directly with the audience. This raises a question: How can a magazine, in a climate of increased scarcity of financial and staffing resources, gain meaningful insights into readers' actions and decision-making processes in a timely and financially prudent manner?

This report seeks to provide one answer to this question by proposing and analysing a novel method for conducting qualitative and quantitative analysis of a magazine's audience using Twitter. To achieve this, I conducted a pilot study to

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[2] Magazines Canada, 'Consumer Magazine Media Fact Book 2015' (Magazines Canada, 2015), http://www.magazinescanada.ca/search-media?media_file_id=1922.

[3] Explicit data, such as user responses, as opposed to implicit behaviour that is tracked. Both provide direct input form users.

[4] 'Web Analytics Tools, Event Tracking & More | Google Analytics Features – Google', accessed 3 October 2016, https://www.google.ca/analytics/standard/features/.

survey Twitter users directly on the platform as a series of tweeted messages. This was a part of my research assistantship at Simon Fraser University from May 2016 until September 2016, where my role was to conduct a literature review of survey methodology research and design a pilot study to test running a survey entirely *within* Twitter. The initial research into conducting large scale surveys on Twitter using an automated bot was part of a larger project led by Juan Pablo Alperin to use the same methods to assess the societal impact of scholarly articles on social media. In 2015, Alperin conducted a pilot study to survey users who shared scientific articles via Twitter gathered from Altmetric.com.[5] He showed using a Twitterbot to be a viable method for conducting a survey online.

The survey I conducted targeted Twitter users who shared a link to a *New Yorker* article and asked them a question about their reading habits. As part of the pilot study, I conducted background interviews with magazine industry professionals to understand their current audience survey practices and a literature review to serve as the basis for my survey methodology. I present this novel survey method as an additional tool for magazines to consider for conducting large scale audience analysis in a short amount of time with minimal financial investment required. To achieve this, I used a series of JavaScript scripts that interacted with the Twitter Application Programming Interface (API) that can both record tweets with associated metadata, such as user screennames, and post the survey questions to Twitter. I collectively refer to this series of scripts that record and post a series of questions, or microsurveys, to users as a "Twitterbot." I chose Twitter to conduct this pilot survey using the *New Yorker* because it has a well-established community of users on Twitter.[6]

Chapter Two provides background information on current industry audience analysis practices and needs in order to frame the applicability of an approach such as

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[5] Juan Pablo Alperin, 'Moving beyond Counts: A Method for Surveying Twitter Users', in *Altmetrics15 Workshop* (Altmetrics Conference, Amsterdamn, Netherlands, 2015); Juan Pablo Alperin, 'The Public Impact of Latin America's Approach to Open Access' (STANFORD UNIVERSITY, 2015).
[6] The *New Yorker* has 7.03 million followers on Twitter as of December 12, 2016.

Twitterbot protocol outlined in this report. The following chapters are organised around the implementation of a pilot study using the Twitterbot survey method. In Chapter Three, a literature review of the existing body of work on survey methodology and social media research establishes the context and precedent for the Twitterbot. Chapter Four describes the experimental method used to test the effectiveness of the Twitterbot. Chapter Five presents the results of the experiment, and Chapter Six discusses the results and presents inferences to draw from the results this type of experiment can provide, and their future use and applications for magazines. Finally, Chapter Seven concludes the report with challenges for future use and implementation in the magazine industry as well as opportunities for further study.

Chapter Two: Audience Analysis Practices

As magazines transition from a print-only business to one that must have a multi-platform strategy to succeed, they are faced with a different kind of audience than they had in the past. First, the audience is online regardless of their preferred media consumption method. A report by Magazines Canada in 2015 found that all generations use a mix of digital and traditional media.[7] Those who are avid magazine readers or users of three or more social media brands are highly engaged with magazines on social media.[8] This speaks to a digitally savvy and engaged magazine readership. However, this presents a challenge for magazines to expand and capture digital readership when profit margins for magazines are already tight.[9]

Expanding digital programs may be difficult because slim profit margins make publishers vulnerable and anxious about developments that threaten existing revenue models. Limitations on increasing revenue have traditionally left magazines dependent on advertising, which necessitates convincing advertisers that magazines are still an effective way to reach their audience. This is done through audience research and analysis, but there is a need for faster and more comprehensive audience information for magazines. Individual magazines are moving forward as best they can but still would like to have access to not only more audience information but also different types of audience insight.

Current audience analysis practices

At an individual level, magazine publishers make use of a variety of audience analysis tools, including annual reader surveys, in-person events, Google Analytics, and other forms of online engagement, such as contest/giveaways on social media, to analyse

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[7] Magazines Canada, 'Digital Magazine Media Fact Book 2015' (Magazines Canada, 2015), 134, http://www.magazinescanada.ca/search-media?media_file_id=1915.
[8] Ibid., 71.
[9] Ontario Media Development Corporation Magazine Industry Advisory Committee, 'Magazine Publishing Industry Profile' (Ontario Media Development Corporation, 13 June 2016),
http://www.omdc.on.ca/collaboration/research_and_industry_information/industry_profil
es/Magazine_Industry_Profile.htm.

their audience. To better understand what magazines' current practices are, a number of editors and publishers were contacted to provide background information on the tools they use. For this group, annual readership surveys are one of the primary means for magazines to learn about their audience. They all conducted their surveys at most once a year, some even less often, citing a lack of staff time and money to conduct the surveys more often. Jim Tobler, editor at *MONTECRISTO*, said he conducts the large reader surveys sparingly to confirm *MONTECRISTO's* actual readership demographics align with their editorial vision.[10] Tania Lo, co-publisher of *Momentum*, indicated they conduct an annual readership survey and expressed interest in doing more in-depth audience analysis but also cited a lack of time and money for not doing more.[11]

Another primary method of audience analysis for magazine editors is in-person events. This manifests itself in different ways for different magazines; some hold annual awards while others have regular events they co-host with sponsors. For magazine editors, this is an opportunity to meet face-to-face with their readers—see who they are, how they dress, what they like. It is a form of audience research highly valued by editors, but events also require a lot of time and effort to plan and execute successfully, and attract attendees interested on a limited subject. Even then, the results of a magazine's staff interactions with their audience at events are not systematically recorded and analysed, but rather used to confirm pre-existing notions about the audience, similar to the annual surveys.

In addition to in-person events, magazines also use analytic software to understand their audience. Tools, such as Google Analytics, are used to monitor a magazine's website for its distribution of exclusive online content and content that also appears in the print edition. This can be used to monitor activity in real time for data such as demographics and page interactions, which can be useful in making decision around how the content should be presented to the user. Though it takes

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[10] Jim Tobler, editor of *MONTECRISTO*, a Vancouver-based lifestyle magazine
[11] Tania Lo, co-publisher of *Momentum*, a Vancouver-based urban cycling magazine

relatively less time to implement, it can run in the background without human intervention. Tobler and many other magazines use Google Analytics in common tasks such as A/B testing[12] around the magazine's website for elements such as a subscribe button, links to other articles and images accompanying an article. Google Analytics can provide insight into which of the variants are getting more clicks, a deeper scroll depth, or whatever the magazine is using as a measure of success. Though Google Analytics provides a wealth of powerful tools for analysing the behaviour of users on the web site, it does not provide information about specific people who use them, only aggregated information.

Online interactions, such as social media engagement, contests, and the use of shareable content also play a significant role in a magazine's audience analysis strategy. For Lauren Cheal these are a primary means of interacting with the magazines' audience directly.[13] Both *Modern Dog* and *Modern Cat* interact with their readers in social media through shared content and contests, with prizes typically donated by advertisers or sponsors. These bring the magazine, advertisers or sponsors, and readers together all in one space. This provides the magazine with valuable insights about who interacts with the brand online, but is also a challenge because, as Cheal said, the magazines are primarily print-based.

All of these audience analysis techniques, when combined, provide a partial picture of a magazine's audience for the purpose of confirming the current audience meets with the editors' expectations of who is reading the magazine. Under current magazine publishing models, magazines do not have additional time or money to devote to expanding their audience analysis practices.

Current audience analysis needs

As the information from editors and industry reports show, magazine editors are too busy running and publishing a magazine to spend more time and energy analysing

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[12] A/B testing compares two version of a website with two variations on an element to see which variant performs better.
[13] Lauren Cheal, Audience Development and Digital Marketing Director at *Modern Dog* and *Modern Cat* magazines

their audience. For example, large, annual surveys, while rich in information, are costly to conduct and can take many months from start to finish. Annual surveys serve as a single piece in a larger set of checks and balances to ensure the editorial message and magazine brand conforms to the magazine's actual readers. If the surveys show a spectrum of readers the magazine is expecting, then there is no cause for alarm and they can continue devoting their time to producing and managing the day-to-day operation of the magazine. This is not to say magazine editors do not want to learn more about their readers. On the contrary, all editors interviewed expressed a desire to learn as much about their audience as they could.

This suggests there is a need for audience analysis methods that fit within magazines' current audience analysis needs: a greater understanding of their audience, but through a low time/money commitment. Especially needed is information which is not currently being collected using existing audience analysis methods. For example, annual surveys provide detailed information on readers but are cumbersome to conduct and can be done at most once a year. They also only target existing subscribers and do not capture non-subscribers, a challenge with any method involving a subscriber list. Google Analytics provides usage and demographic data, but cannot provide information about individuals and their thoughts. Other methods that do involve direct interaction with the audience, such as in-person events or social media interaction, require more time and energy than most magazines with small staffs have time for.

All of this speaks to both a need and desire for access to more qualitative data on audiences' thoughts and sentiments regarding topics deemed important to the magazine. There is room and desire for audience analysis beyond checking that the current readership conforms to the magazine's preconceived notion of who their audience is. This also would require methods that are both light on monetary cost and time investment. As this report suggests, social media may present a promising environment for magazines to conduct such audience surveys and analysis. Web 2.0 technologies make social media a powerful medium with the ability to make use of

applications, such as automated microsurveys, to employ unexplored methods of audience analysis.

Chapter Three:

Survey Methodology and Social Media Literature

In order to understand how audience analysis may be implemented using social media, the author conducted a literature review to examine what work has been done in the area of online surveys that may be applicable to social media surveys. Additionally, the literature review informs what survey design considerations are used in the pilot survey in Chapter Four. During the course of the literature review, the author found that there is no literature on the topic of conducting surveys on social media specifically. Social media research has involved reaching out to social media users, but very little is known about the best practices for conducting a survey *within* a social media platform. Over the course of the literature review, two main topics emerged that connect social media: survey methodologies and audience analysis. Survey methodology literature encompasses methodology and best practices for conducting web surveys in a generalized context. The second topic, social media research, is primarily focused on passive data gathering methods and audience research. In the literature, these concepts are connected by subject but not explicitly linked. This literature review begins to link these topics for use in a social media survey.

Survey Literature

The pilot study is a survey, and therefore requires knowing existing methodology and best practices to make use of the existing body of knowledge on surveys. Survey literature has extensively covered online survey methodology and best practises for web survey design.[14] Web surveys have a number of advantages over traditional

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[14] See: Marcel Das, P. Ester, and Lars Kaczmirek, *Social and Behavioral Research and the Internet: Advances in Applied Methods and Research Strategies*, European Association of Methodology (New York: Routledge, 2011); Roger Tourangeau, Frederick G. (Frederick George) Conrad, and Mick Couper, *The Science of Web Surveys* (Oxford: Oxford University Press, 2013); Roger Tourangeau, Mick P. Couper, and Frederick G. Conrad, '"Up Means Good" The Effect of Screen Position on Evaluative Ratings in Web Surveys', *Public Opinion Quarterly* 77, no. S1 (1 January 2013): 69–88, doi:10.1093/poq/nfs063.

survey methods, such as mailed paper surveys or telephone surveys, including their global reach, flexibility, speed and timeliness, and low cost.[15] Though these aspects may be advantageous for magazines that wish to learn more about their audience, they also present challenges when considering their ease of use and proliferation such as the survey being seen as junk mail.[16] Though these practices have been well documented in web surveys, the literature has not considered social media as a platform for conducting surveys.[17] While web survey methodology best practices are not directly applicable to conducting surveys on social media, they do provide a background and basis for moving forward using new survey methods and modes.

Challenges to web surveys include the comparatively lower response rates[18] and larger rate of survey break off based on lack of motivation or task complexity.[19] Lower response rates combined with fewer participants in web surveys make it difficult to draw widespread conclusions from the survey results. Murphy notes this as a methodological concern for the applicability and validity of web survey results, as they target different populations using different methods and means (e.g. were they comparable to results from traditional surveys?).[20] A similar challenge exists when using social media to reach participants. Murphy et al. have investigated the state of social media use in surveying, and point out the challenges of providing a

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[15] Mick P. Couper, *Designing Effective Web Surveys*, Ebrary Academic Complete. (Cambridge: Cambridge University Press, 2008), http://site.ebrary.com/lib/sfu/Doc?id=10265000.
[16] Joel R. Evans and Anil Mathur, 'The Value of Online Surveys', *Internet Research* 15, no. 2 (1 April 2005): 195–219, doi:10.1108/10662240510590360.
[17] Couper, *Designing Effective Web Surveys*; Mick P. Couper and Peter V. Miller, 'Web Survey Methods Introduction', *Public Opinion Quarterly* 72, no. 5 (1 December 2008): 831–35, doi:10.1093/poq/nfn066.
[18] Duncan D. Nulty, 'The Adequacy of Response Rates to Online and Paper Surveys: What Can Be Done?', *Assessment & Evaluation in Higher Education* 33, no. 3 (1 June 2008): 301–14, doi:10.1080/02602930701293231.
[19] Markus Steinbrecher, Joss Roßmann, and Jan Eric Blumenstiel, 'Why Do Respondents Break Off Web Surveys and Does It Matter? Results From Four Follow-up Surveys', *International Journal of Public Opinion Research* 27, no. 2 (1 June 2015): 289–302, doi:10.1093/ijpor/edu025.
[20] Joe Murphy, 'Survey Methods: Challenges and Opportunities', in *Innovations in Digital Research Methods*, ed. Peter Halfpenny and Rob Procter (Los Angeles: SAGE, 2015), 85–104.

representative sample of the real world from social media data.[21] This is important when conducting a survey on social media because a representative sample is the first step in ensuring the results are relatable to other groups, for example a magazine's entire readership. In a field with more direct ties to social media research, Japec et al. have explored big data and the possibilities for combining big data with survey data, by for example, using behaviour data collected online together with a customer survey on brand recognition.[22] This illustrates the challenges present with the intersections of different survey methods and the difficulty in drawing conclusions from them.

Web surveys also present a new set of challenges regarding their design. Principles applicable to print or telephone surveys do not necessarily translate online. To establish the best practices for our survey design, the literature about best practices for web survey design was investigated. Like the developments in survey methodology, changes happen rapidly with web survey design, and there is an increased output of scholarly work done on question design and issues of visual aspects of questionnaires given the self-administered nature of web surveys.[23]

Much of the research into best practices for survey design is directly relevant to surveys conducted via social media. For example, Schwanda-Sosik et al. found being concise in the entire presentation of the survey and keeping the sample population targeted and relevant (i.e. interested in the topic) to be effective methods for improving response rate when conducting a short, targeted microsurvey. [24] Tourangeau et al. also found relevance to be important and point out that any

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[21] Joe Murphy et al., 'Social Media in Public Opinion Research Executive Summary of the Aapor Task Force on Emerging Technologies in Public Opinion Research', *Public Opinion Quarterly* 78, no. 4 (21 December 2014): 788–94, doi:10.1093/poq/nfu053.
[22] Lilli Japec et al., 'Big Data in Survey Research AAPOR Task Force Report', *Public Opinion Quarterly* 79, no. 4 (21 December 2015): 839–80, doi:10.1093/poq/nfv039.
[23] Nora Cate Schaeffer and Jennifer Dykema, 'Questions for Surveys Current Trends and Future Directions', *Public Opinion Quarterly* 75, no. 5 (1 December 2011): 909–61, doi:10.1093/poq/nfr048.
[24] Victoria Schwanda-Sosik et al., 'Online Microsurveys for User Experience Research', in *CHI '14 Extended Abstracts on Human Factors in Computing Systems*, CHI EA '14 (New York, NY, USA: ACM, 2014), 889–92, doi:10.1145/2559206.2559975.

examples given in the survey should be the most relevant examples possible. [25] Additionally, survey sponsorship can have a positive impact on response rate if the sponsor is seen as being influential or authoritative (e.g. a university).[26] These general considerations are applicable to the final presentation of the Twitterbot survey method proposed here and will be discussed in the next chapter.

The literature outlines best practices for question formulation as well. Again these principles and best practices can be directly applied to formulating survey questions for social media surveys. For a question to be effective, it needs to be simple and easy to understand, though not necessarily short.[27] The register of the language used is equally important. In a study of "low-brow" vs. "high-brow" wording of questions, Blasius and Friedrichs found low-brow, or simple wording to be the most effective means of communicating the intent of a question.[28] In a separate study, Lundmark, Gilljam, and Dahlberg found questions posed in the simplest, most straight-forward manner (e.g. "Is it possible to trust people") to be effective at eliciting response and reducing task difficulty.[29] In a similar study investigating wording simplicity, Christian, Dillman, and Smyth found that complex items, such as date format (MM/DD versus month and date) hinder understanding

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[25] Roger Tourangeau et al., 'The Effects of Providing Examples in Survey Questions', *Public Opinion Quarterly* 78, no. 1 (20 March 2014): 100–125, doi:10.1093/poq/nft083.

[26] Shelley Boulianne, Casey A. Klofstad, and Danna Basson, 'Sponsor Prominence and Responses Patterns to an Online Survey', *International Journal of Public Opinion Research* 23, no. 1 (20 March 2011): 79–87, doi:10.1093/ijpor/edq026; Bing Pan, Arch G. Woodside, and Fang Meng, 'How Contextual Cues Impact Response and Conversion Rates of Online Surveys', *Journal of Travel Research* 53, no. 1 (1 January 2014): 58–68, doi:10.1177/0047287513484195.

[27] Duane F. Alwin and Brett A. Beattie, 'The KISS Principle in Survey Design Question Length and Data Quality', *Sociological Methodology*, 12 April 2016, 0081175016641714, doi:10.1177/0081175016641714.

[28] Jörg Blasius and Jürgen Friedrichs, 'The Effect of Phrasing Scale Items in Low-Brow or High-Brow Language on Responses', *International Journal of Public Opinion Research* 21, no. 2 (20 June 2009): 235–47, doi:10.1093/ijpor/edp018.

[29] Sebastian Lundmark, Mikael Gilljam, and Stefan Dahlberg, 'Measuring Generalized Trust An Examination of Question Wording and the Number of Scale Points', *Public Opinion Quarterly* 80, no. 1 (20 March 2016): 26–43, doi:10.1093/poq/nfv042.

and reduce response rate.[30] Together these studies show that simple, straight-forward question presentation is the most effective way to ensure understanding in a web survey.

Just as the question wording affects response rates, the question type does as well. Couper provides an overview of the potential question types available to use in a web survey, such as multiple choice, yes/no questions, open-ended questions, etc.[31] Others have more closely investigated individual question types and have variously recommended yes/no questions,[32] open-ended questions,[33] and personalizing the request (also known as an egoistic appeal).[34] These best practices are thought to generally hold true but were each tested under different experimental conditions in the context of more traditional web surveys. Additionally, they have not been tested in surveys conducted on social media, something this study begins to address. While the survey methods have not been tested on social media, there has been considerable social media research that is relevant here, starting with audience research.

Social Media Research

Understanding survey methodology is an important aspect of the literature, but understanding audience research is also necessary to ensure an accurate representation of the audience is captured. Like survey methodology, audience research has also changed as more data can be gathered online. In the past decade, it has focused on

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[30] Leah Melani Christian, Don A. Dillman, and Jolene D. Smyth, 'Helping Respondents Get It Right the First Time: The Influence of Words, Symbols, and Graphics in Web Surveys', *Public Opinion Quarterly* 71, no. 1 (20 March 2007): 113–25, doi:10.1093/poq/nfl039.

[31] Couper, *Designing Effective Web Surveys*.

[32] Vicki Broman and Georgios Tserdanelis, 'What You Need to Know to Design Quality Surveys', *Speech Technology Magazine* 19, no. 4 (Winter 2014): 37–37.

[33] Karsten Mueller et al., 'Effects of Personalized Versus Generic Implementation of an Intra-Organizational Online Survey on Psychological Anonymity and Response Behavior: A Field Experiment', *Journal of Business & Psychology* 29, no. 2 (June 2014): 169–81, doi:10.1007/s10869-012-9262-9.

[34] Mogens Jin Pedersen and Christian Videbæk Nielsen, 'Improving Survey Response Rates in Online Panels Effects of Low-Cost Incentives and Cost-Free Text Appeal Interventions', *Social Science Computer Review* 34, no. 2 (1 April 2016): 229–43, doi:10.1177/0894439314563916.

using social media audiences and data as a supplementary source of data to be paired with traditional methods of audience measurement and research, such as consumer surveys.[35] Additionally, measuring an audience now takes into consideration the rapid changes in technology. Audience measurement methods recognise that media evolve in response to environmental conditions, for example the fragmentations of media audiences leading to an increased selection of platforms for consuming media.[36] Audiences also evolve in response to environmental conditions, which can be seen in audiences distancing themselves from so called mass media. One can see similar changes when looking at user engagement online. User engagement research now considers factors such as frequency of web usage, variety of ways it is used, and to what extent it is used.[37] These studies show that new audience research methods are needed as the media landscape changes. Conducting surveys in this new media environment could make use of more recent, up-to-date audience research methods because older, more established survey methods do not consider the new media environment.[38]

Researchers have begun to explore doing this using social media. Procter, Voss, and Lvov use social media data for audience research and investigate the advantages (e.g. built-in access to data) and limitations (e.g. self-selected sample of users on social media) to conducting audience research on social media.[39] Examples of this in practice have included projects investigating Italian radio listener

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[35] David Mathieu et al., 'Methodological Challenges in the Transition towards Online Audience Research', *Participations: Journal of Audience & Reception Studies* 13, no. 1 (May 2016): 289–320; Philip M. Napoli, 'Audience Evolution and the Future of Audience Research', *International Journal on Media Management* 14, no. 2 (1 April 2012): 79–97, doi:10.1080/14241277.2012.675753.

[36] Napoli, 'Audience Evolution and the Future of Audience Research'.

[37] Kelly L. Page and Mark D. Uncles, 'The Complexity of Surveying Web Participation', *Journal of Business Research* 67, no. 11 (November 2014): 2356–67, doi:10.1016/j.jbusres.2014.02.001.

[38] Mathieu et al., 'Methodological Challenges in the Transition towards Online Audience Research'.

[39] Rob Procter, Alex Voss, and Ilia Lvov, 'Audience Research and Social Media Data : Opportunities and Challenges', *Participations: Journal of Audience & Reception Studies* 12, no. 1 (2015): 470–93.

engagement on Twitter in conjunction with a network analysis[40] and tracking user engagement with corporate social media accounts in China.[41] These show the opportunity to use social media interactions to understand user behaviour. While these studies are moving in a new direction for audience research, they are using the social media data passively. They examine the data but do not interact with it further. For example, one might collect tweets and analyse their contents but not contact the Twitter users who posted them. These studies present an opportunity for researchers to expand upon the prevalence of social media use and the audience research opportunities this provides for use in social media surveys.

At the same time audience research has changed in reaction to new media environments, the media environment has also changed. Part of this has to do with the advent of social media, which came about because of Web 2.0 technologies. Web 2.0 is characterised by internet users creating content, whether it be social media updates, posted videos, or usage data, such as clicks.[42] Research on Web 2.0 is focused on understanding these events along with their advantages and disadvantages. Though researchers have investigated the complexities of conducting research on the internet, few researchers have explored actual best practices for interacting with people on social media in a social research context.[43] A major opportunity for conducting this research using social media lies in a given platform's Application Programming Interface (API), which is "basically an interface of a

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[40] Tiziano Bonini, Alessandro Caliandro, and Alessandra Massarelli, 'Understanding the Value of Networked Publics in Radio: Employing Digital Methods and Social Network Analysis to Understand the Twitter Publics of Two Italian National Radio Stations', *Information, Communication & Society* 19, no. 1 (2 January 2016): 40–58, doi:10.1080/1369118X.2015.1093532.
[41] Linjuan Rita Men and Wan-Hsiu Sunny Tsai, 'Beyond Liking or Following: Understanding Public Engagement on Social Networking Sites in China', *Public Relations Review* 39, no. 1 (March 2013): 13–22, doi:10.1016/j.pubrev.2012.09.013.
[42] Cédric Courtois and Peter Mechant, 'An Evaluation of the Potential of Web 2.0 APIs for Social Research', in *Audience Research Methodologies: Between Innovation and Consolidation*, ed. Geoffroy Patriarche et al., vol. 2, Routledge Studies in European Communication Research and Education (Abingdon, Oxon: Routledge, 2014), 212–24.
[43] Karpf, 'Social Science Research Methods in Internet Time'.

computer program that allows software to 'speak' with other software"[44] and directly access the database of a social networking site.

APIs are a promising tool for conducting surveys on social media, as they allow the surveyor direct access to the users on a social network, giving them the ability to post and record responses. APIs present challenges to researchers for a number of reasons, but are still a powerful tool. For example, researchers have documented the uses and methodological challenges of using APIs as a research tool, such as limited or controlled access to data through the API, but it has primarily been considered a tool for data gathering, not as a means to interacting with users.[45] This is because most research using APIs on social media has dealt with passively collected data, though other factors may be involved. For example, the Twitter API has fewer restrictions on gathering passive data than on interacting with users.

Using the API for social research also poses a challenge because of the potential inconsistency in the data quality (e.g. APIs delivering only a portion of the data); data access (e.g. changes in features available/accessible through API);[46] generalization of sample, (e.g. lurkers vs. participants in a social media setting); and imposed rate limits or limited access to databases through an API.[47] Despite these limitations, researchers have previously used social media data to supplement and/or replace traditional surveys,[48] though these differ from the type of survey described in this report because the Twitterbot survey is conducted entirely on the social media platform, whereas Schober et al. describe using and interpreting the data rather than

[44] Stine Lomborg and Anja Bechmann, 'Using APIs for Data Collection on Social Media', *The Information Society* 30, no. 4 (8 August 2014): 256–65, doi:10.1080/01972243.2014.915276.

[45] Anja Bechmann and Peter Bjerregaard Vahlstrup, 'Studying Facebook and Instagram Data: The Digital Footprints Software', *First Monday* 20, no. 12 (15 December 2015), http://uncommonculture.org/ojs/index.php/fm/article/view/5968; Lomborg and Bechmann, 'Using APIs for Data Collection on Social Media'; Procter, Voss, and Lvov, 'Audience Research and Social Media Data : Opportunities and Challenges'.

[46] Bechmann and Vahlstrup, 'Studying Facebook and Instagram Data'.

[47] Lomborg and Bechmann, 'Using APIs for Data Collection on Social Media'.

[48] Michael F. Schober et al., 'Social Media Analyses for Social Measurement', *Public Opinion Quarterly* 80, no. 1 (20 March 2016): 180–211, doi:10.1093/poq/nfv048.

directly asking the user a question.[49] Others have looked into what can be learned from this data, both as a replacement for traditional surveys or as supplementary data, for example the usefulness of looking at social network relationships as indicators for behaviours.[50]

Some researchers have taken the potential use of APIs a step further and have used the YouTube and Twitter APIs to post survey invitations to users, either as a comment or tweet, to complete a web survey hosted elsewhere on the internet.[51, 52] Although these studies have researchers interacting with social media users directly, they do not thoroughly document or discuss best practices for contacting them and optimizing response rates. These studies report a response rate between 10-15%.[53] Survey methodology literature does cover best practices and documents the factors affecting web survey response rates.[54] Others still have compared the differences between online and paper-based surveys,[55] but none have explored response rates in the context of social media surveys.

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[49] Ibid.

[50] Sharad Goel and Daniel G. Goldstein, 'Predicting Individual Behavior with Social Networks', *Marketing Science* 33, no. 1 (24 October 2013): 82–93, doi:10.1287/mksc.2013.0817.

[51] Courtois and Mechant, 'An Evaluation of the Potential of Web 2.0 APIs for Social Research'; Jeroen Stragier and Peter Mechant, 'Mobile Fitness Apps for Promoting Physical Activity on Twitter: The# RunKeeper Case', in *Etmaal van de Communicatiewetenschap*, 2013, https://biblio.ugent.be/publication/3129098/file/3153471.

[52] See also: Cédric Courtois, Peter Mechant, and Lieven De Marez, 'Teenage Uploaders on YouTube: Networked Public Expectancies, Online Feedback Preference, and Received On-Platform Feedback', *Cyberpsychology, Behavior, and Social Networking* 14, no. 5 (30 November 2010): 315–22, doi:10.1089/cyber.2010.0225; Cédric Courtois, Peter Mechant, and Lieven De Marez, 'Communicating Creativity on YouTube: What and for Whom?', *Cyberpsychology, Behavior, and Social Networking* 15, no. 3 (3 February 2012): 129–34, doi:10.1089/cyber.2011.0401; Cédric Courtois et al., 'Uploaders' Definition of the Networked Public on YouTube and Their Feedback Preferences: A Multi-Method Approach', *Behaviour & Information Technology* 32, no. 6 (1 June 2013): 612–24, doi:10.1080/0144929X.2011.586727.

[53] Courtois, Mechant, and De Marez, 'Teenage Uploaders on YouTube'; Courtois, Mechant, and De Marez, 'Communicating Creativity on YouTube'.

[54] Weimiao Fan and Zheng Yan, 'Factors Affecting Response Rates of the Web Survey: A Systematic Review', *Computers in Human Behavior* 26, no. 2 (March 2010): 132–39, doi:10.1016/j.chb.2009.10.015.

[55] Nulty, 'The Adequacy of Response Rates to Online and Paper Surveys'.

Both the survey and social media research literature are rich with detailed studies surrounding best practices and potential pitfalls for conducting surveys and audience analysis online, but none directly address how to best conduct a survey on a social media platform, like Twitter. The Twitterbot pilot study described in this report investigates the best practices and methods for conducting a survey on Twitter with consideration given to the findings of the literature review. It will both expand upon existing best practices and take into account the findings and cautions from the outlined studies.

Chapter Four: Methods

This report sets out to describe a novel approach to conducting audience analysis on a social media platform, in this case Twitter. This chapter outlines the method used to conduct a pilot study surveying Twitter users who shared a link to a *New Yorker* article. The purpose of the experiment conducted was therefore twofold: first, to develop an automated Twitterbot for use in large scale audience analysis, and second, to develop methods for conducting surveys within social media and establish best practices for conducing such surveys. As mentioned in Chapter One, a Twitterbot is a series of automated scripts used to interact with the Twitter API. This allows it perform any commands accessible via the API, such as fetching tweets based on a search query or gathering metadata associated with a user.[56] The scripts can then write information obtained from the API endpoints to a database for analysis or further use by the Twitterbot. It can then use information stored in the database, such as a unique tweet or user identifier, to pose a pre-composed message to a user. For the pilot study, twelve of these pre-composed messages were used to test which question design factors yield the highest response rate.[57]

Procedure

A list of Twitter users that shared a link to a *New Yorker* article in the body of the tweet was gathered from Twitter to ensure a large enough pool of users were captured to conduct the pilot survey. The metadata associated with each posting on Twitter, or tweet, including user information, time posted, content of tweet, etc., was gathered via the Twitter REST API and stored in a SQLite database hosted on a secure university server between July 5, 2016 and July 13, 2016. These tweets were gathered by entering in the search terms '`"newyorker.com" filter:links`' into the API endpoint '`get search/tweets,`' which scanned all tweets that contained a link to the *New Yorker's* website and returned them. This allowed for

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[56] For a complete list of Twitter REST API endpoints, see
https://dev.twitter.com/rest/reference.
[57] See Table 1 for a complete listing of question wording.

capturing tweets from users who shared a link to a *New Yorker* article either as an original tweet or retweet. A sample of 1331 users was selected in reverse chronological order from the tweets stored in the database and divided into twelve subsamples. Each subsample presented one of the twelve question variants based on formulation factors identified in the literature (See Table 1 for question variant attributes and question text). Users were asked in a tweet if they read the *New Yorker* primarily online, in print, or both. This question was chosen as it captured audience insight on a large scale that other tools like Google Analytics could not show but should be seen primarily as illustrative, as the method allows any question that can fit in a tweet (140 characters) to be asked. The questions were posed to each user either as an @mention (mentioning the user's screenname in the body of the tweet) or an @reply (directly responding to the user's question as a reply) delivered via the Twitter REST API. The responses and all associated metadata were recorded to the database, after which the response rates for each subsample group was tabulated and recorded. The database was then exported as a CSV file and cleaned up for analysis using Open Refine.

Table 1. Question variant attributes and levels

Variant	Question Type	Egoistic Appeal	Reply vs. mention	Question text
1	1	No	Reply	@screenname Please help us understand New Yorker readers. What format do you prefer to read it in? Thanks!
2	1	No	Mention	Please help us understand New Yorker readers. What format do you prefer to read it in? Thanks @screenname!
3	2	No	Reply	@screenname Please help us understand New Yorker readers. Do you read it primarily online? Thanks!
4	2	No	Mention	Please help us understand New Yorker readers. Do you read it primarily online? Thanks @screenname!
5	3	No	Reply	@screenname Please help us understand New Yorker readers. Do you read it online, in print, or both? Thanks!
6	3	No	Mention	Please help us understand New Yorker readers. Do you read it online, in print, or both? Thanks @screenname!
7	1	Yes	Reply	@screenname You recently tweeted a New Yorker article, could you tell us: What format do you prefer to read it in? Thanks!
8	1	Yes	Mention	You recently tweeted a New Yorker article, could you tell us: What format do you prefer to read it in? Thanks @screenname!
9	2	Yes	Reply	@screenname You recently tweeted a New Yorker article, could you tell us: Do you read it primarily online? Thanks!
10	2	Yes	Mention	You recently tweeted a New Yorker article, could you tell us: Do you read it primarily online? Thanks @screenname!
11	3	Yes	Reply	@screenname You recently tweeted a New Yorker article, could you tell us: Do you read it online, in print, or both? Thanks!
12	3	Yes	Mention	You recently tweeted a New Yorker article, could you tell us: Do you read it online, in print, or both? Thanks @screenname!

Sample

The sample was drawn from a population of tweets (N = 43,279) that shared a link to a *New Yorker* article between July 5, 2016 and July 13, 2016. A sample size of n = 1331 was chosen to ensure the sample size was aligned with typical sample sizes for a

population of this size.[58] This conforms to the rule of thumb for sample size calculation for discrete-choice experiments (DCE), which says a sample size of at least 100 can provide a basis for expressing preferences,[59] as no previous study has done anything similar that this pilot study could reference. The limitations to this method and sample are primarily that this experiment is being conducted as a pilot and proof-of-concept study.

Treatment and Instrument

The treatment consisted of twelve question design variants (factors) to be tested for their effectiveness in eliciting a response. The test was conducted as a discrete-choice experiment (DCE) based on the large number of question variants identified and the study's interest in identifying a few important factors.[60] The sample was divided into twelve subsamples and each subsample was asked a different permutation of the question based on the identified question design factors. The first factor is the question type, which includes an open-ended question ("What format do you prefer to read it in?"), a yes/no question ("Do you read it primarily online?"), and a multiple choice question ("Do you primarily read it online, in print, or both?"). The second factor is whether the question presents the question in a straightforward manner ("Please help us understand *New Yorker* readers") or as a statement that appeals to the user's ego[61] ("You recently tweeted a *New Yorker* article, could you tell us:"). The third factor is whether the question is sent as an @reply or @mention. In an @reply, the tweet begins with the user's screenname and includes the user's original tweet in the thread. An @mention had the user's screenname tagged the end of the tweet and did not contain information about the user's original tweet. All question variants are listed in Table 1.

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[58] Ondřej Vilikus, 'Optimization of Sample Size and Number of Tasks per Respondent in Conjoint Studies Using Simulated Datasets', n.d.

[59] Esther W. de Bekker-Grob et al., 'Sample Size Requirements for Discrete-Choice Experiments in Healthcare: A Practical Guide', *The Patient* 8, no. 5 (2015): 373–84, doi:10.1007/s40271-015-0118-z.

[60] Damaraju Raghavarao, James B. Wiley, and Pallavi Chitturi, *Choice-Based Conjoint Analysis: Models and Designs* (Boca Raton, FL: Chapman & Hall/CRC, 2011).

[61] Also known as an egoistic appeal.

Each subsample was posed one complete question (e.g. "@screenname Please help us understand New Yorker readers. What format do you prefer to read it in? Thanks!"). Each question variant was posed to approximately 110 users, meaning each subsample contained approximately 110 users. Each outgoing question was recorded in the database and associated with the user's id. When a user replied to the survey question, their response was recorded in the database and associated with the same user id.

Chapter Five: Results

The purpose of this research was to test this method of conducting a survey on Twitter, and the results in this chapter should be interpreted as such. To that end, a total of 1331 users were asked one of 12 question variants, surveying how they preferred to read the *New Yorker*. For a complete list of question wordings and variants, see Table 1. Of the 1331 Twitter users survey, 309 users provided a valid response for an overall response rate of 23.2%. See Table 2 for response rate by question variant. This is almost double the response rate of some online surveys using social media.[62] The question with the lowest response rate, "Please help us understand New Yorker readers. Do you read it primarily online? Thanks @screenname!" (variant 4), had a response rate of 9.9% while the question with the highest response rate, "@screenname You recently tweeted a New Yorker article, could you tell us: Do you read it online, in print, or both? Thanks!" (variant 11), had a response rate of 40.0%.

Table 2. Question variant response rates

Variant	Question count	Response count	Response rate
1	119	20	16.8%
2	112	14	12.5%
3	116	20	17.2%
4	111	11	9.9%
5	106	24	22.6%
6	112	24	21.4%
7	110	31	28.2%
8	109	24	22.0%
9	114	33	29.0%
10	105	26	24.8%
11	110	44	40.0%
12	107	38	35.5%
Grand Total	**1331**	**309**	**23.2%**

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[62] Courtois and Mechant, 'An Evaluation of the Potential of Web 2.0 APIs for Social Research'.

Of the question types, variants that used multiple choice questions had the highest response rate, with an average of 29.9% while variants using open-ended questions had the lowest response rate on average, with 19.9% (see Table 3). This is consistent with Schwanda-Sosik et al.[63] Variants using an egoistic appeal in the question wording had a higher response rate than variants not using an egoistic appeal with response rates of 29.9% and 16.8% respectively, which is consistent with Pedersen and Nielsen.[64] Question variants that replied directly to the users' original tweet had a response rate of 25.6% while question variants that simply mentioned users in the body of the tweet had a response rate of 21.0%, which is consistent across all question variants. This is also evident in the question variant with the highest overall response rate, variant 11, which used a multiple choice question, an egoistic appeal, and was posed as a reply to the user's original tweet, showing that the question characteristics have a cumulative effect on response rates.

Table 3. Response rate by variant attributes

Question type	
open-ended	19.9%
yes/no	20.2%
multiple choice	29.9%
Ego appeal	
no	16.8%
yes	29.9%
Reply/mention[65]	
reply	25.6%
mention	21.0%

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[63] Schwanda-Sosik et al., 'Online Microsurveys for User Experience Research'.

[64] Pedersen and Nielsen, 'Improving Survey Response Rates in Online Panels Effects of Low-Cost Incentives and Cost-Free Text Appeal Interventions'.

[65] @replys start with the intended recipient's screenname and directly reference and link to the original tweet whereas @mentions contain the intended recipient's username elsewhere in the tweet and do not contain reference to the original tweet. Both methods notify the recipient they were mentioned in a tweet.

The time it took for users to respond to the survey varied greatly, ranging from less than an hour to more than a month (the median reply time for users to respond to the survey question was 5 hours). The majority of people responded in a short period of time with 23% of respondents responding within an hour of the question being sent. Within 12 hours of the question being sent, 76% of users who responded had done so. Within 24 hours 87% of respondents had sent a reply to the question. Figure 1 depicts the response delay from the time the question was sent to the time users responded and shows the drop off in responses after the first few hours.

Figure 1. Time respondents took to reply to question

This response time was also affected by the time of day the question was sent and something that also varied in relation to the time zone specified in the recipient's Twitter profile. Sending the question late at night (12:00 am to 5:00 am) resulted in some of the highest and lowest response rates per hour in the user's time zone, but averaged out to 24.7% (see Table 4).

When examining the time questions were sent in relationship to the response delay, the beginnings of a pattern emerged that roughly correspond to response rates for the time of day questions sent (Figure 2). The peaks and troughs in Figure 2 represent lengthy and short response times respectively. These roughly correspond to times of day with higher and lower response rates. For example, between 3:00 pm and 8:00 pm in Figure 2, the response delay dips, while the response rate (PDT) in

the afternoon (between 12:00 pm and 5:00 pm) has the highest response rate for any time of day at 26.2%.

Table 4. Response rate by time of day question sent

Time of Day	Response rate (User)	Response rate (PDT)
Night (0-5)	24.7%	21.2%
Morning (6-11)	27.2%	23.8%
Afternoon (12-17)	24.2%	26.2%
Evening (18-23)	19.1%	20.9%
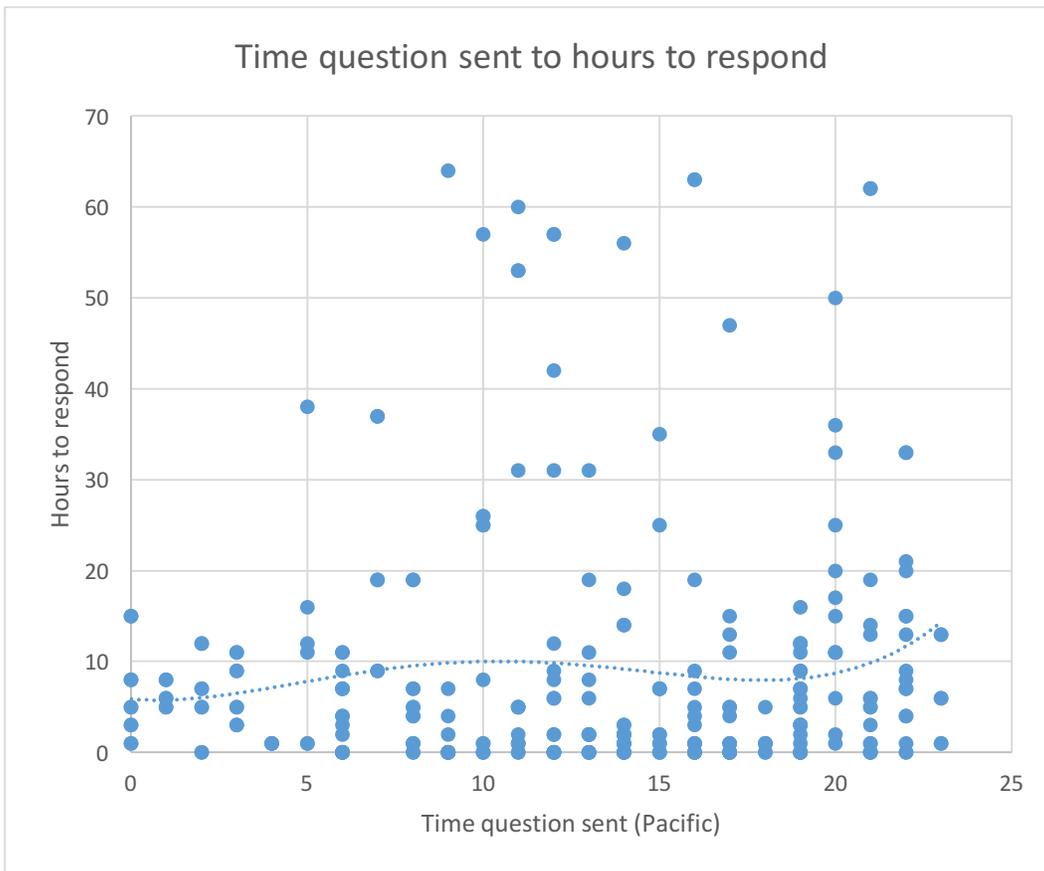
Figure 2. Time question sent to hours to respond

A final type of result in this experiment is the answers to the questions that users provided. Of the 309 responses recorded, 294 answered the question directly (see Table 5). Users who read the *New Yorker* primarily online accounted for the majority at 80.9% of respondents. 10.0% replied they prefer to read the *New Yorker* both in print and online, while 4.2% preferred to read it in print only. The

remaining 4.9% either replied they did not read the *New Yorker* or did not answer the question. There were differences among the question types, such as open-ended questions receiving the most no/neither answers, but as this was not the primary focus of the study, no conclusions may be drawn from this information. Because the goal of this study was to assess the method, not the results of the question asked, these results cannot completely accurately capture the answer to the question (e.g. multiple choice answers vs. yes/no question answers) and should be interpreted as such.

Table 5. Results of survey, "Do you read the *New Yorker* primarily online, in print, or both?

Response type	Respondents	Percentage
No/neither	15	4.9%
Online	250	80.9%
Print	13	4.2%
Both	31	10.0%
Grand Total	**309**	

Table 6. Survey results by question variant

Question type	No/neither	Online	Print	Both	Grand Total
Open-ended	10	66	4	9	**89**
Yes/no	2	80	7	0	**89**
Multiple choice	3	103	2	22	**130**

Other insights can be drawn from the results, such as some users offered up additional information in addition to answering the question posed. For example, several users noted a preference of reading on mobile or desktop while reading online using third-party reading services such as Pocket. Some expressed a desire to read in print, but cited the high cost of the print magazine outside of the United States. Others still prefer to access the *New Yorker* via social media with some saying they read it specifically on Facebook.

Chapter Six: Discussion

Findings

The results of the pilot study show that, when taking the response rates and results of the questions asked into consideration, users are willing to respond to questions posed to them on social media in the context of magazine audience behaviour. The response rate for all question variants asked was 23.2% with response rates for individual question variants as high as 40%. Nulty cites the average web survey response rate as 33%,[66] while Courtois and Mechant report receiving response rates between 10-15% for the surveys they conducted where a link to a web survey was distributed as a YouTube comment.[67] Though use of this survey method does not guarantee response rates that high, it does show that this method has the potential for producing high response rates when question formulation and survey design is optimized for the needs of the audience, or at least response rates comparable to traditional web surveys. It likely helps that this survey asked participants about their own behaviour and that they were interested in the question. This agrees with Tourangeau et al.'s work that says question and topic relevance can boost response rates.[68]

The results of the response rates the question variants received have strong implications for future use in surveys by magazines. Some results aligned closely with previous research outlined in Chapter Three. In particular, the findings agree with the work of Pedersen and Nielsen, who recommend using an egoistic appeal to users as a cost-free method to increase the response rates for surveys.[69] The findings also

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[66] Nulty, 'The Adequacy of Response Rates to Online and Paper Surveys'.
[67] Courtois and Mechant, 'An Evaluation of the Potential of Web 2.0 APIs for Social Research'.
[68] Roger Tourangeau et al., 'The Effects of Providing Examples in Survey Questions', *Public Opinion Quarterly* 78, no. 1 (20 March 2014): 100–125, doi:10.1093/poq/nft083.
[69] Pedersen and Nielsen, 'Improving Survey Response Rates in Online Panels Effects of Low-Cost Incentives and Cost-Free Text Appeal Interventions'.

agree with Schwanda-Sosik et al.[70] and Alwin and Beattie[71] on using simple, straight forward language. Question variants using open-ended language, the most complex and ambiguous question type, had the lowest response rate at 19.9%, while multiple choice questions, which offered the clearest and least ambiguous set of choices, had the highest response rate at 29.9%. The best practices and recommendations outlined in Chapter Three do not necessarily explicitly make recommendations for conducting surveys on social media. However, this work suggests that question simplicity and clarity are just as applicable on social media, especially given Twitter's predisposition to brevity and the short lifespan of individual tweets.

The response rate results also showed some unexpected results, which had not been previously considered in survey methods and best practices literature. Question variants sent as replies had a higher response rate than variants sent as mentions. This may be for a number of reasons, but one clear indicator may be the context replies provide. When responding to a tweet as a reply, the original tweet thread is preserved, so if a question were posed to a user several days or weeks (or even years) after the original tweet was posted, the user would not need to remember context as it is provided (see Figure 3a and 3b). The reverse is also true. If a question is posed out of context where the users is only @mentioned, several users expressed confusion as to what our survey was referring. In question variants that mentioned users, some responded with answers like, "Can't find which one you're referring to," and in response to the question preamble, *you recently shared a* New Yorker *article…*, "I did?".

[70] Schwanda-Sosik et al., 'Online Microsurveys for User Experience Research'.
[71] Alwin and Beattie, 'The KISS Principle in Survey Design Question Length and Data Quality'.
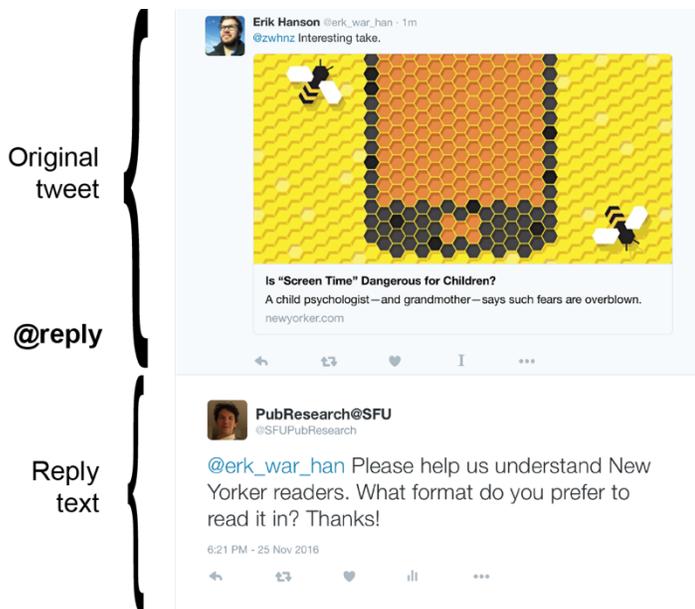
Figure 3a. Example of @reply appearance

Figure 3b. Example of @mention appearance

Quick turnaround for user responses has positive implications for magazines. Time and resource strapped magazines often need information as quickly as possible, and quick user responses to surveys would allow magazines to make use of the survey results shortly after the survey is posed. It bodes well for future implementation of automated Twitterbot surveys for magazines that nearly a quarter of respondents answered the survey question within an hour. If such a survey were run on a regular basis, magazines could have access to new, up-to-date audience information on a rolling, daily basis with the potential for new information to be coming in hourly. This stands in direct opposition to larger reader surveys, that according to the

background interviews, can be conducted at best once a year.[72] Additionally, this has positive implications for the likelihood of users seeing and responding to the questions. Although users receive a notification when they receive a reply or mention, these can quickly be buried in a busy Twitter user's queue of notifications and tweets. If a quarter of users are responding within an hour and three-quarters are responding within 12 hours, that greatly increases the likelihood that users will see and encounter the tweets, thus responding to the survey.

As the results of the time the question was sent showed, spikes in response rates appeared at different times depending on the time zone. For example, with questions sent at night in the PDT time zone, there was a response rate spike for that period. This may be for a number of reasons. Many users may check their Twitter feeds first thing in the morning before work, and the *New Yorker* has a large North American readership base.[73] This may indicate North American users saw these questions in the morning and responded. Though the data does not provide definitive results, time zones may be a factor when conducting a survey through social media where the time scale considered is hourly as opposed to monthly or yearly as with other survey methods.

Users overwhelmingly declared they prefer reading the *New Yorker* online, but they were users who had already showed a predisposition to reading articles online because they had shared at least one article on Twitter already. The sample of original accounts gathered is the largest flaw in questions asked in this survey. They were gathered over the course of a few days with few articles shared. This would introduce sample error if one were trying to examine the *New Yorker* readership as a whole, but in the context of actual usage example for magazines, a survey method like this would primarily be used to survey an online, social media using audience,

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[72] Lauren Cheal, 'RE: Request for Information', 17 May 2016; Tania Lo, Audience Research Interview, Phone, 17 May 2016; Jim Tobler, Audience Research Interview, In-person, 24 May 2016.
[73] Statista, 'New Yorker - Circulation 2015 | Statistic', *Statista*, 2015, https://www.statista.com/statistics/191788/us-magazine-audiences-2010-the-new-yorker/.

thus reducing the chance of misrepresenting the audience under investigation. However, the purpose of this pilot study was to test the method, not adequately answer the questions.

Another critical insight from this survey method is the additional, unasked-for information that users offer in addition to directly responding to the question. Given the nature of Twitter and the open response format, it is expected that a certain number of responses would not contain a direct answer to the question. The vast majority of users did provide an answer, and many of those carried additional insight, such as their reading preferences for short versus long articles. The tweet format allows for additional, unprompted information to be provided. Though the questions were posed as simple open-ended, yes/no, or multiple choice questions on preferred reading formats, users offered explanations as to why they answered the way they did. This is a unique feature to conducting the survey via Twitter. Even if the question is posed as a yes/no or multiple choice question, there is still room and flexibility for users to answer the questions however they want with as much commentary or explanation as they want. For users who said they primarily read the *New Yorker* online, many said they actually preferred to read the magazine in print, but for various reasons could not. Some cited the high cost of the print magazine in countries outside of North America, while others expressed feeling inundated with so much content that they felt overwhelmed by the number of mostly unread copies of the magazine that piled up in their house. All this is insight that would be unavailable through Google Analytics.

Online readers also expressed this from another angle, stating they enjoyed reading it online so they could more easily pick and choose which articles to read. For some, social media acted as a content filter, only reading articles recommended to them via social media. A respondent wrote, "@SFUPubResearch Online. Driven by other people's tweeted links." Others offered up more detailed reading preferences within the larger context of online reading. One user indicated a preference to read long-form articles on a desktop/laptop and read short articles on their mobile device. Five users pointed out they did all their *New Yorker* reading on the mobile app

Pocket. Eighteen users also readily gave information on their subscription status to the *New Yorker.* Some users were subscribers; others were not. Still others used to be but had let their subscription lapse because of the overwhelming amount of content. A respondent wrote, "@SFUPubResearch I click from the daily email & on my phone. As God is my witness, I'll never have a pile of 90% unread New Yorkers again!"

Not everyone provided direct input on the magazine. Several users misunderstood the survey, believing it to be about the newspaper, the *New York Times* rather than the magazine, the *New Yorker.* This is a limitation of this study as it focused on a single, well-known publication. The open format and potential for confusion are further limitations on the survey. Even if everything is carefully worded and clearly laid out, users may still misinterpret and provide unanticipated answers. All of this information, positive, negative, or seemingly irrelevant, can lead to useful insight for magazines wishing to better understand their readers. It provides a unique look into the actual usage and interactions a large number of users have with the magazine.

<div align="center">

Use and application for magazines

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The findings of this pilot survey serve to illustrate some potential uses and application of this method for magazines. This method has its advantages and limitations, but the high response rate shows its potential to reach users and engage with them. Users demonstrated a willingness to participate in a survey conducted within social media, and to engage with the magazine conducting the survey and provide additional information. For example, one user included a follow-up question, wondering if their information was helpful. All of the metadata associated with the user is also captured, allowing for the possibility to understand why a user may have responded that way.

Using this survey method, magazines can receive answers to survey questions quickly. For a magazine that publishes online content up to several times a day, having direct access to their audience on a time scale measured in hours rather than weeks or months could be invaluable. This pilot survey asks users about their reading

preference, but could just as easily ask a timelier question, thereby allowing a magazine to have direct responses from their audience they would otherwise be unable to access.

Surveys conducted via social media require minimal preparation time compared to web surveys or in-person interviews and can be conducted at any time. In this case, any time can mean any time of day, anywhere in the world much like all internet services. It also means the survey can be implemented quickly, without a lengthy planning step. The platform and internet infrastructure are inherent to the social media platform on which the survey is being conducted. In this example, the *New Yorker* already has an established presence and following on Twitter. A complete, multi-page survey along with a landing page and invitation, does not need to be constructed. This kind of microsurvey only requires magazines to formulate a single question and pose it to their audience. For magazines with little time or resources to devote to audience analysis, this type of survey offers flexibility and fluidity in when surveys are conducted. Though interpreting the data can be time consuming, this too could be automated. However, this was out of scope for this pilot survey.

This method also opens up a means to identify a larger range of potential survey participants. In-person interviews and web surveys are limited in how potential respondents are identified. For in-person interviews and the kind of informal conversations common at magazine-hosted events, the pool of respondents and audience is limited to the people who physically attend the event and are willing to talk about their experiences. Web surveys are subject to the same limitations, but provide a broader pool of potential respondents, from newsletter subscribers to visitors to the magazine's website. They are still limited to users who have already expressed sustained interest in the magazine by subscribing to the newsletter or visiting the website.

The microsurvey on social media, on the other hand, is not limited to these constraints in the same way. It is limited by the number of users on social media, but is not limited to people already associated with the magazine. In this example, users

who shared a link to a *New Yorker* article were chosen, but this is not the only criteria by which users can be selected. Any identifying information or metadata about users that is publicly accessible provide the potential for selecting respondents. On Twitter, this can be anyone who has shared a link to a specific article or link from a specific domain, a hashtag, a user in a given geographic area, or users following or followed by other Twitter accounts. Any kind of identifiable relationship that provides access to a useful and relevant audience segment can be surveyed using this method.

Perhaps of most importance to magazines considering this, the survey method provides a structured framework for accessing audience insights with little investment required, both in time and money. First, this survey method can successfully be conducted and managed by a single person. This saves on time and human resources diverted away from other pressing aspects of magazine publishing and on the money it would be required to pay staff to run and manage larger, more time consuming audience analysis methods, such as in-person interviews.

Second, the monetary cost for conducting surveys using this method is limited to paying the person operating and managing the survey. Magazines usually lack the capacity and expertise to conduct large scale, annual audience surveys on their own. Surveys like that are typically conducted by a third party, and their prohibitive cost typically limit magazines to conducting it every other year or annually at most. The survey method outlined in this report requires no expensive, specialized infrastructure, only a server from which to conduct the survey and record the responses. Magazines who have any online presence will have this kind of infrastructure already in place. This method does require some start up programming knowledge to write the scripts to run the bot and manage the database where the responses are stored. These are typical skills required to complete and manage any web development project. The cost for a web developer or editor to acquire these skills would only need to be incurred once, as the skills, once acquired, would be applicable to all future surveys conducted.

Accessing and taking advantage of the large quantity of data generated by the internet is not new for magazines. As indicated in Chapter Two, magazines make

regular use of internet analytic tools, such as Google Analytics, and annual surveys. However, this survey method provides results and insights that annual readership surveys cannot. This survey method allows magazines to directly receive answers to questions from individuals. The responses and data gathered can be aggregated to provide an overview, such as the results of the pilot survey described in this report. The responses can also be viewed at the individual level, providing both a large scale and small scale picture from the same dataset. This is not to say that magazines should ignore annual readership surveys, but rather use this survey method to supplement the information gathered from it. This survey method provides magazines with the best of big data and individual interviews.

A second advantage of the survey described in this report over large scale analytics is the ability to ask many different types of questions, both in content and format. For example, it could ask an open-ended question about preferred consumption methods such as "what do you like about reading the *New Yorker* online?". Such questions would yield user-preference information about website visitors that expand on existing analytic insight from Google Analytics. It could be used to confirm preconceived notions about who interacts with the magazine, consumer preferences, content preferences, or anything else the magazine can think of. In short, it provides the magazine with greater control over the question types and topics available to them.

Beyond its differences from other survey methods, this pilot survey method provides a number of other advantageous qualities for use and application for magazines. First, the survey, by its nature, is always conducted where the audience already is. Despite its importance in any magazine's publishing model, there is always more potential for interaction and insight from users on social media. This method removes barriers and go-betweens for directly accessing both existing and potential audiences. Second, it provides a new method to fill the insight gap that exists between implicit behaviour data from Google Analytics and the explicit, but time consuming and infrequent, data from in-person interviews. In capturing human answers and metadata from individuals on a large scale, it fills this insight gap

through frequent but small surveys, therefore providing magazines with up-to-date audience analysis.

Chapter Seven: Conclusions

This report identifies a need within the magazine industry for further audience analysis in a way that is efficient and cost effective and presents a novel method for conducting automated audience microsurveys on the social media platform Twitter. A pilot study was conducted using the method described in the report to survey Twitter users who shared a link to a *New Yorker* article. The survey as a whole received a 23.2% response rate, almost double the response rate of previous online surveys using social media,[74] with the best question variants quadrupling the response rate of previous surveys. The positive results of this pilot study show this microsurvey method to be a viable solution to the audience analysis problem magazine publishers face as outlined in Chapter Two. It is both a flexible and easily implemented method as well as low on cost and time investment.

Though this method presents the opportunity for a low cost, high impact survey method, it does present a number of considerations for a magazine trying to implement and maintain it. This survey method makes use of automated scripts that interact with the Twitter API and a SQL database. First, conducting and maintaining a project of this nature requires a certain level of technical expertise. The pilot study described in this report required knowledge of JavaScript and Node.js, SQL, database management, data analysis methods, and the Twitter API. Much of this knowledge may already be present in magazine staff involved with web development and maintenance, e.g. JavaScript and SQL. Others, such as the Twitter API client, will not be commonly known but will not require an entirely new skill set for magazine staff to learn. Second, this survey method relies on automated scripts. The scripts are run from a server, send requests to the Twitter API, receive responses, then write the information to a database on the magazine's server. For this automation to run smoothly, all these communication channels need to be accessible and unimpeded. It requires clean code and error-catching measures to ensure the automated scripts

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[74] Courtois and Mechant, 'An Evaluation of the Potential of Web 2.0 APIs for Social Research'.

continue to run in the case of problems. Ensuring this happens requires a significant time investment in monitoring and testing the method as a whole before it can be smoothly implemented.

The investment required for both of these considerations is offset by the results these microsurveys provide. As described in Chapter Two, magazine staff already have little time and money to do more than run the magazine and continue to publish content. Taking time away from doing this to learn the necessary programming know-how presents a significant challenge for implementing this method in magazines. Magazines can approach this in two ways. First, they can see learning the technical knowledge required for this survey method as an investment in their ability to understand their audience, which magazine staff have identified as invaluable. Second, it can be an area for third parties to invest their time in, and sell this service back to magazines. Both options present magazines with either time saving or money saving measures, depending on their financial or staffing situation.

Challenges

Going directly to social media to conduct surveys presents challenges. Relying on the third party (i.e. Twitter) is inherently risky because what is and is not allowed on the platform can be changed on a whim without notice.[75] For example, Twitter is an ideal platform to conduct the kind of automated survey described in this report because it supports open, public APIs. Any investment in this method is subject to Twitter's willingness to provide public access to its APIs or even changes to how a user accessed them. This would necessitate a different approach to using this survey method. Such changes can happen easily and without warning, such as the survey having its access to the Twitter API cut off. There is also the challenge of Twitter continuing to lose active users.[76] A magazine may invest in a method for one social networking site, then have to move to a different one with their audience. These

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[75] Ibid.
[76] Jessica Guynn, 'Twitter Growth Grinds to a Halt', *USA Today,* 11 February 2016, http://www.usatoday.com/story/tech/news/2016/02/10/twitter-fourth-quarter-earnings-user-decline/80178140/.

changes would not necessarily make future surveys impossible but rather increase the difficulty and complexity with which they are conducted. This means magazines would need to be adaptable and flexible in their implementation, which may raise the cost and time required.

An additional risk to magazines using this method is its novelty factor. The high response rate may partially be because of the newness of the method. If Twitterbot surveys become commonplace, social media users may be inundated with automated surveys asking frequent questions, and thus reduce the response rate. Another associated factor is people's familiarity with bots on social media. Even if the account states it is an automated account, users may not be familiar with bots and think they are interacting with a person, and make them more likely to respond.

A final challenge inherent to this survey method is the potential for data overload. A core strength of this method is the flexibility and amount of information it can capture. However, if it is not managed properly, this can easily become overwhelming. Each tweet captured contains extensive metadata about the tweet's history, any imbedded links or mentions, and the user's information, including location, time zone, their entire list of followers and friends. As more and more tweets are captured, this can quickly add up. For example, in the pilot study, a population of more 40,000 tweets were collected. If this method were implemented by a magazine on a weekly basis, they would quickly become inundated with data. Therefore, it is important for anyone using this survey to have a clear idea of what kind of information or insights they wish to gather with the data. Having a clear goal or objective when conducting this kind of survey will help the surveyor manage the data and not lose the potential insights among the other, less relevant pieces of information. Natural language toolkits for processing large amounts of textual data can also assist magazines with interpreting and analysing their data as they gather more and more of it. This would be necessary for large-scale implementation of this method, but this pilot study was focused primarily on the method used to ask the questions, not the interpretation of the data.

Future research

This report describes a pilot study for conducting automated microsurveys on social media. This pilot successfully demonstrated the viability of this as a survey method, but there is still much to investigate and explore surrounding this method. This study investigated which question variants contributed to a higher response rate among Twitter users. Along these same lines, future studies should consider not only the question type (e.g. multiple choice, yes/no, etc.) but also different kinds of publications and question areas. The *New Yorker* is an internationally recognized brand. How would the same question fare on a smaller, more regionally oriented publication? The subject matter of the publication should also be considered. Are these methods as effective with niche publications? Are there particular niches where it is more effective? Different question areas should also be investigated. This study asked after reading medium preferences of users, but how would the response rates be if the question asked about content, content types, or even demographic information? To better understand the potential for automated microsurveys, more work should be done to understand the impact of these different publication and question factors.

Automated workflows are critical to the success of this survey method. This pilot study demonstrates the viability of such a method for a magazine publisher to conduct audience analysis, but it does not investigate the best practices for using an automated survey workflow. Empirical testing should also be conducted on the automated aspects of the survey method to assess strengths and weaknesses in the system. A robust automated workflow with appropriate error handling is necessary for this survey method to be functional and therefore widely disseminated and implemented. Future work could also explore best practices for automated text analysis using natural language processing. As magazines make regular use of these surveys, they will have an ever-increasing wealth of textual response from their audience to analyse, which can be efficiently and effectively analysed using natural language processing tools. This would allow textual responses to be coded in a way that can be easily summarized and interpreted by magazine staff. It could provide a

summary of findings similar to a Twitter poll, though it is currently not possible to use the Twitter poll feature via the API. This and best practices for interpreting the textual data are areas for further research.

As a final consideration for further research, future studies should investigate the viability of this survey method on other social media platforms, e.g. Facebook, YouTube, etc. This report focuses primarily on Twitter, but magazines interact with their audiences on many different social media platforms. Of particular note to magazines would be the difference and overlap of audience segments on the different platforms. A better understanding of how this method translates to different platforms would allow magazines to make better use of the surveys, using them in their identified areas of strength.

The magazine industry has an identified need for audience analysis tools that are both time and cost efficient. This report presented a novel method for conducting automated audience surveys on Twitter and showed it to be a viable tool to fill the magazine industry's audience analysis need. It does not presuppose to be a replacement for existing tools magazines are currently using such as annual surveys, in-person interviews, or Google Analytics, but rather it serves to fill an information gap magazines have about their audiences within the time and financial constraints dictated by the magazine industry's current operational norms. It presents an exciting possibility for magazines to further their understanding of who their audience is and how they interact with them. This small pilot study shows how users interact with the *New Yorker* (whether they read it in print, online, or both), but it also shows how they feel about their usage, providing valuable insight from individuals. It documents a type of audience analysis that had not been previously documented on a large scale without a large investment in time or capital.

As magazines continue to move into online spaces and span the print and digital worlds more and more, methods like this will continue to grow in importance and prominence. There is already a large, demonstrated need for deeper, evidence based audience analysis that capture both the large picture and the voices of individuals as this method does. New social media platforms and magazine

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publishing paradigms will arise with time, but this survey method can endure as a framework and basis for audience analysis methods as digital publishing continues to develop in the years to come.

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