How Journalists Establish Trust in Numbers and Statistics: Results From An Exploratory Study

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ABSTRACT: Statistics are an essential part of science communication, yet there is little theory about how journalists decide which numbers to trust. Interviews with working journalists showed that many believe statistics are so real as to be unchallengeable. Journalists are more likely to be aware of the trust problem when they have experience with a particular statistic and know its construction. Overall, they tend to follow accepted statistical conventions observed by their beats in determining which numbers to use. This follows theories of trust in news sources and the cultural belief in the transparency of measured reality in general.

KEYWORDS: journalism, journalists, news beats, news sources, statistics, trust

1. INTRODUCTION

Statistics are widely acknowledged to be an essential part of journalism (Curtin & Maier 2001; Harrison, 2016; McConway, 2016). This may be because modern political debate seems inconceivable without numbers (Rose, 1991), from measures of political power such as vote totals to gauges of public opinion, from diagnostic statistics about the economy and social problems to the kinds of demographic and financial numbers, such as tax receipts, that allow the state itself to function.

Important though numbers may be, journalism and communication scholars have failed to agree on exactly how they work in public life or in journalism. Becut and Croitoru (2016) believe public comprehension of statistics is a cultural issue and the role of numbers in the media should be viewed as a social rather than a mathematical problem. According to Murray and Gal (2002), there is no universally accepted meaning to numeracy because statistics contain both mathematical and psychological components as well as social and political ingredients that go into their creation. Putting it in different terms, Hand (2009) says statistics are an alliance between theories of probability, the methodologies used in counting or surveys, and the means of presentation with its rhetorical components. In this sense, statistics may not be "basically" a form of math at all. In parallel with this research, other investigators (Ahmad, 2016; Brand, 2008; Maier, 2002; McConnell, 2014; Moynihan, et al, 2000) have documented specific examples of mishandling of statistics in journalism. Some continue to blame this on lack of math skills (cite?). Journalists, in this view, are seen as more comfortable with qualitative thinking, feelings, and words than with mathematical concepts and numbers (Nguyen & Lugo-Ocando 2016). However, Koetsenruijter (2011) believes "numbers vs. narrative" is a false dichotomy. The many individual studies, whether focused on journalism or not, have failed to yield a single overarching theory that can explain the different ways journalists decide to trust or distrust

particular numbers in daily news reporting, nor the processes, in or out of the newsroom, that contribute to these.

This study uses qualitative interviews with journalists working in a range of different venues to discover how they think, reason, and make decisions about which sources to trust when they use measured data, such as numbers or statistics, in their work. It also seeks to broaden the study of statistics in journalism beyond the focus on professional shortcomings by incorporating findings from political science about the problematic nature, origins, and construction of statistics. It is built around sociological theory about the news production process as a social system, focusing on the ways the routines, norms, and expectations of news production shape the editorial product.

2. LITERATURE REVIEW

2.1. Origins of Numbers and Their Politics

Most journalists probably do not doubt that the measured facts they report on—gross domestic product, inflation, crime rates, college graduation rates, for example—describe something real and possibly unchallengeable (cite?). Yet a number of investigators, including Boellstorff (2013) and Andreas and Greenhill (2010) have concluded that statistics cannot be considered or used apart from their origin as human-created artifacts. Prewitt (2013) studied the complex negotiations that take place in order to define such phenomena as homelessness, racial discrimination or sexual assault and choose appropriate methods for measuring them. When the thing being measured is new, controversial, or concealed, such as pollution, drug dealing or sex trafficking, debates over the process of measurement can become highly contested (Andreas & Greenhill 2010; Parasie, 2015; Parasie & Dagiral 2012; Rose, 1991). Because these debates are often integral to the process of defining a social problem, raising their visibility in the media, they also give rise to multiple politics of numbers. In this process, disputes about what deserves to be measured are necessarily normative in part, but their expression in numbers makes them seem like something beyond norms (Amberg & Hall 2010; Fahnestock 1986; Strathern 2000). This logic is taken up and strengthened by advocacy groups and social movements, who know the rhetoric of rationality, expressed through numbers, gives them credibility and improves access to news coverage (Best, 1987).

In that sense, possession of some kind of statistics is almost a ticket of admission to the public sphere. But the tension between the need for numbers and their imperfect status as human-created artifacts takes place offstage, so to speak, typically before the numbers become visible to the public or to journalists, or is confined to the footnotes where it rarely attracts news coverage (Bhatti & Pederson 2015; Rose, 1991). Over time, this has the effect of reifying the measurements into "official" categories, concealing the difference between the phenomenon itself and its means of measurement, and obscuring what is not measured. Strathern (2000) says this process defines accountability solely in terms of what can be measured, a phenomenon she labels "audit culture" (pg. #). Only certain forms of evidence, created through certain practices, are considered a basis for action, making contemporary policymaking and public debate impossible without them. The implications for journalism should be clear, especially for what Fishman (1980) calls routine journalism, "the standard fare that fills newspapers day after day…what most newsworkers would consider good, plain, solid, honest, professional news reporting" (p .15). This leads to the first research question:

RQ1: What does this class of media actors, who provide such a large share of daily news coverage, understand about how numbers are defined and gathered?

2.2 Trust and Credibility in the Newsgathering Process

Traditional newsroom sociology (Fishman, 1980; Gans, 2004; Graber, 1988; Reich, 2006; Tuchman, 1972) sees source trust as governed by regular norms and relationships that may have been built up over long periods of time. Reich (2006) argues that neither journalists nor sources dominate this relationship exclusively, which can shift depending on circumstances and story or can even vary for different sources on the same story. Journalists' evaluations of source credibility can depend on many things, including independent corroboration or past history with sources (Reich, 2011) in a process that may evolve over time. Reich calls this discretional credibility. The tendency substitute trust for independent verification begins earlier in beat reporting than for investigative reporting (cite?).

Wintterlin (2017) says journalists' relationships with sources are ongoing social relationships with both social and psychological components. These include expectations about the actions of others and willingness to act on the basis of those expectations (Lewicki, McAllister, & Bies 1998). For journalists, the expectations include include familiarity with the subject matter (the beat) or past experience with particular human sources, particularly if the journalist and source agree not only on the accuracy of particular facts but have similar views about their relevance. Not all trust, however, is based on personal relationships. Shapiro (1987) says impersonal trust can increase based on relationships between social actors such as institutions, which are not governed (or not primarily governed) by social relations. In such situations, norms of trust function differently and journalists may feel free to rely on regular, authoritative, or highly professionalized sources to establish the reliability of numbers, providing balance only when they see the issue as contested (Wade, 2012) such as a visible dispute between different ways of measuring the same phenomenon.

A point on which many scholars agree (Lugo-Ocando & Faria Brandão 2016) is that both journalists and audiences see statistics as a legitimate source of information about general trends in society. This perception that data is credible by default is one of the things that has led to the expansion of data journalism (cite?). Choices about how the phenomenon under study is defined tend to be embedded in the methodology which may or may not be visible to journalists. Yet the choices always reflect to some extent the outlook and biases of the social actors who originated them. For example Lugo-Ocando and Faria Brandão (2016) say most official crime figures derive from law enforcement and prosecutors and reflect their views of crime rather than those of academics, social workers, victims or perpetrators.

Some or all of these criteria may be different for science. Hansen (1994) says that because it deals in facts that are difficult to verify independently, science journalism may be unique in its dependence on particular kinds of sources and in the degree of mutual cooperation and trust needed between journalists and their sources. At the same time, a great deal of science news follows accepted definitions of news, being event-driven and frequently linked to an elite group of scientists who are seen as having the authority to speak on their area of expertise (Corbett & Durfee, 2004). Under these circumstances, repeated appearances in the media as a credible scientific source may reinforce other journalists' trust when they cannot verify that trust on their own (Dunwoody & Ryan, 1987).

2.3. Influence of Newsroom Culture

Sociologists studying the news production process have tended to treat the newsroom as a social system in which the editorial product, the newsgathering process, the writing process, and the internal and external work relationships are tightly intertwined and circumscribed by stable rules. Some early investigators, such as Tuchman (1972) and Fishman (1980) have stated, or at least implied, that this system exercises such control over what topics merit journalistic attention, how they will be reported, what will be treated as a legitimate source, how facts will be verified or falsehoods rejected, and how the finished editorial product emerges from these, as to suggest that what news is constituted from the processes that created it. Later studies (Cottle, 1995; Cottle, 2000; Stonbely 2015) criticized this earlier work for focusing solely on organizational constraints while treating actions by individual reporters or editors, or larger cultural forces, as mere noise.

While these criticisms have value, they do not obviate the larger point: that organizational forces and the journalistic social system play a decisive role shaping newsgathering choices. Yet there may also be another reason for focusing on organizational forces, especially when studying individual reporter choice: these are what journalists themselves see and consciously affect their thoughts and actions, often in minute detail. It seems likely, therefore, that norms, roles, and routines play a large part in how journalists make choices about incorporating numbers and statistics into their stories.

Sociological studies of news production (Fishman, 1980; Gans, 2004) show that journalists follow structured routines, such as the beat system, that shape their normative concept of what counts as news. One of Tuchman's conclusions (1972) is that the news production process does not normally allow time for philosophically or methodologically sophisticated determination of whether something is true, nor for justifying the basis for the truth-judgment. Instead, the definition of news and its verification are determined by conventions, including the idea of objectivity and the separation of fact from opinion. Facts, of course, are verified, but the verification process uses another set of conventions including reliance on authority or on balance between conflicting versions when facts are in doubt in order to let viewers determine their own conclusions. Tuchman (1972) believes this system continues because it serves journalists' and audience needs. Although individual journalists may recognize its shortcomings, Schultz (2007) says this system of thinking, as well as the routines from which it grows and that support it are largely tacit and taken for granted.

Sigal (1973) says both the routines and the authority reinforce each other as conventionalized ways of providing routine access to an accepted form of verification. Because official news is official, it also meets a standard for so-called "straight news," a simple ordering of the facts. One of the advantages of this kind of official authority is that even when controversial it still guarantees a serious or at least a respectful hearing. Although he does not mention statistics, in this context, Himmelstein (2014) recognizes that numbers have many characteristics which make them useful for journalistic routines: they are "abstract, concise and portable;" they travel well (Sauder & Espeland 2009 p. 92); and they are widely used in defining the social problems that form the subject matter of much journalism. In addition, numbers are almost always the product of exactly the experts and authorities on whom journalists rely, giving these sources a structural advantage in the creation of "straight news" (Sigal, 1973). In this sense, the journalistic use of numbers may serve to reinforce both the authority on which journalists rely and the norm of relying on it. Consistent with this interpretation, Koetsenruijter (2011) found that the use of numbers in news stories increased their credibility.

This discussion leads to the following research questions:

RQ2: What role do norms and routines play in what journalists understand about how numbers are defined and gathered?

RQ3: What role do norms and routines play in how journalists verify the validity of numbers?

RQ4: What kinds of external authority legitimates numbers as newsworthy in journalists' decision making?

3. METHODS

As an exploratory study, a series of semi-structured interviews (Lindlof & Taylor, 2011) was employed to reveal not only journalists' differing work habits, but also what they think about their beliefs and ideas and how they justify them. Questions focused on what they understand data to be, how they think it functions, where they see functionality or dysfunction in data, how they decide which statistics to trust or distrust, and how they integrate data and non-data elements into their editorial product. My working assumption, confirmed by observation and analysis, is that consistent patterns will emerge in the way the subjects of these interviews solved their problems with numbers.

3.1 Participants

Nineteen journalists were interviewed for this case study. All subjects were engaged in tasks that brought them in direct contact with sources and required them to process what they learned into finished editorial products every working day. Some participants were identified through a combination of convenience and snowball sampling, including a posting notice on an environmental journalism website. Additional subjects were identified at the 2017 annual meeting of the National Institute for Computer Assisted Reporting (NICAR). Most of the subjects were staff employees, although one student working on college media and two freelancers with a regular roster of editorial clients were also included. In terms of journalism experience, they ranged from beginner (the student) to more than four decades, working for a wide range of news outlets including local and regional newspapers, national newspaper chains, newspaper/website combinations, specialized magazines and web based journals (not blogs).

4. ANALYSIS AND FINDINGS

4.1 Data Analysis

Initial coding frequently represented simple topics such as where journalists stood on their career track (e.g. beginner, intermediate, or veteran). More abstract codes emerged inductively as data analysis progressed. 49 initial codes and 29 subcodes emerged inductively from the 535 separate coding units, with 194 analytical memos. Some codes that described very closely related concepts were eventually collapsed into a single code. A second round of consolidation reduced the initial codes to 26.

4.2 Findings

4.2.1 The Professional Nature of Newswork and the Journalistic Career

Tuchman (1972), Fishman (1980), and others have found that the generation of news (as opposed to the events that make up the news) does not reflect any kind of one-for-one correspondence with these events, but is also strongly influenced by the norms, routines, incentives, and expectations of the news production process itself and its needs. Though this theory has been criticized as overly deterministic (Coddington, 2014; Cottle, 2000; Stonbely, 2015), it still emerged as broadly consistent with how these journalists described their self-concepts and their activities. Regardless of what they did, all subjects were continually and consciously aware of their role in the news production process. Their understanding of their professional role and what was expected of them affected their views of moment-to-moment decisions on particular stories, how these related to other projects on which they were involved, and where these decisions fit with longer-term aspirations for themselves and their organization. They felt these norms to be enabling rather than restrictive, which could have shaped their attitudes toward numbers as news sources.

Subject 13, for example, was grateful to have a constellation of good work relationships that valued the kind of editorial product he wanted to create; he recognized his long-term work was partly sustained by other reporters who did more than their "fair share" of short-term work. Subject 8, a data journalist at a large urban newspaper, stated that she learned her professional values by absorbing them on the job. She found "a level of healthy cynicism and skepticism in newsrooms." Subject 4, a veteran journalist who covers many topics for a newspaper, had a "fun executive editor" who gave newsroom staff the latitude to try things out of the ordinary, such as collecting their own data. Subject 2, who currently does data-based journalism for a newspaper in the South, appreciated editors who asked the same kinds of questions about a story he himself would ask, but recognized "there are bad editors out there."

4.2.2. Origins of Numbers and Their Transparency

Despite the extensive literature on the normative choices behind numbers and their politics (drive-by cites?), many subjects believe, however incompletely, that numbers have a special epistemic status simply by virtue of being numbers. Even though all subjects recognized individual numbers could be problematic, the idea persisted that numbers provide direct access to a kind of truth not available from live sources or eyewitness descriptions. For example, Subject 4 said numbers are "harder to refute" because a number "lends credibility." She was awed at her state's online data portal that let her watch measurements of weather change in five minute increments. It was "amazingly cool," making her very comfortable using it in her news stories. Subject 16, a freelancer covering technology topics, knew she could always get at the truth behind a number, and if she did not immediately understand it, she believed she could find the right person to explain it to her. Subject 12, a veteran newspaper reporter and editor, believed state legislature fiscal analysis agencies are "non-partisan" and:

> fair and equitable with the way they present that information. And I don't think [they] are often questioned by the legislators that are arguing about what those numbers mean in terms of broader policy. And yet they disagree on the broader policy.

This belief about the special characteristics of numbers has been recognized in the larger culture (Rose, 1991), but may function in more intensified form because of the particular needs of journalism. If journalists believe numbers are credible solely by virtue of being numbers, they may use this belief to sidestep the many problems of establishing trust and credibility news workers face as a regular part of their job (Lewicki, et al 1988; Wintterlin, 2017). Experimental studies have shown that numbers are often seen as markers of such journalistic values as accuracy, precision, or credibility (Koetsenruijter 2011; Roeh & Feldman 1984). The frequent use of numbers may also be reinforced by journalism's well-known reliance on official or authoritative sources (Fishman,1980; Sigal, 1973), which are the origin of many of the truth claims journalists use in their reporting. Granting this special status to numbers, in other words, may owe something to journalists' dependence on official forms of knowledge (Schudson, 1989), which are supplied through the organized beat system for learning about newsworthy events. At the same time, statistics, precisely because they convey this sense of authority, may reinforce the strong newsroom incentive to "routinize certitude" (Sigal, 1973, p. 66). Fishman (1980) says journalists often use a change in phase or status of something as markers of new news development and some statistics, such as monthly economic figures, are regular indicators of these phase changes. The seemingly impersonal quality of numbers may be seen as sufficiently trustworthy to be a journalistic norm in itself (Shapiro, 1987). Wade (2012) says journalists may only feel the need to provide balance when they see a fact claim as contestable; numbers may function as a guarantor of credibility in ways that sidestep this need.

4.2.3 Transparency and Nontransparency

Despite their belief in the special status of numbers, almost all subjects understood that individual numbers could be wrong or at least open to challenge. Some appeared to intuitively understand Prewitt's (2013) insight about the normative, negotiated status of category definitions and the imperfections of the counting process. However they appeared to grasp this on a case-by-case basis rather than theoretically. Several discussed the need to apply the learned habit of journalistic skepticism to statistics provided by interest groups and advocacy groups. Subject 5 called this "a tricky question of trust," requiring her to make careful decisions about sources, but she did not offer any principles to guide her decision making about which sources to trust. Subject 4 took her relationships with federal and state public relations agencies for granted even though she knew they were not always equally forthcoming. Subject 12 did not necessarily trust government institutions but recognized his dependence on them:

> If a source has ever led me astray and I know of no occasions that they have led anyone else astray then let's say it's a much more valuable source than the one that is often cited as leading you astry.
>
> Q: Including numerical sources?
>
> A. Sure, yeah. And part of that is just about general credibility but part of that is about mission.

Subject 2, who did data journalism for a newspaper's investigative unit, remained among the most skeptical. He advocated checking into the origins of all numbers to see if they passed the "smell test," and sometimes compared measurements of the same phenomenon by different authorities to determine whether they matched or if they did not match, why not.

These attitudes toward trust are far closer to what investigators such as Reich (2011; 2012), Diekerhof and Bakker (2012) and Wintterlin (2017) have documented about source

credibility. In this process, credibility is discretionary and must be negotiated separately for each source, and sometimes more than once for the same source across different stories. However this degree of scrutiny toward the origins, definition, and methods of collection involved in statistics production was rare, occurring only in high-end investigative reporting. Journalists who covered regular beats or faced the demands of larger output also saw numbers as problematic, but in different ways. Journalists who covered government budgets focused on learning the internal workings of budget creation and budget structure; that is to say, the accounting conventions that determined how budgets were created and measured. The assumptions that led to these conventions were rarely questioned. Both their trust of budget numbers and their skepticism tended to be limited to what could be learned from the budgets themselves or from sources who understood the forms of budget-making the same way.

Subject 18, a political reporter and recent journalism school graduate, believed understanding budgets emerged through making comparisons, such as looking at what was budgeted for in the past, then checking how it was implemented the following year. Like subject 14, a freelance science journalist with many years' experience, Subject 18 looked for big or unusual numbers as sources of news and worked with a nonprofit civic group for new perspectives and information on state finances. This resulted in a story about state legislators with secret side accounts, which she saw as a challenge to normal ideas of transparency about money. However, as long as the civic group had its own agenda, her relationship with them did not produce "the truth," or even a new system of public accounting, but a different view of what the existing system should be measuring.

Subject 3, who covers government and politics for a Midwest newspaper, encountered problems trying to get information on budgets, especially from smaller jurisdictions, because of time constraints. She knew how to work around primary sources to find other sources that might have other views and used disagreements as an opportunity to find fresh sources of numbers. She learned to read budgets in great detail and could spot things to question. Her experience covering controversies over budgets taught her how differences in numbers and measurements can be grounded in normative clashes that, at their core, are not numerical:

> And it's not to say they don't know what that number is, it's just not in the budget document that they use or present to the public. So I've found that the way that they present their budget just means I had to ask a lot more questions before I can write something because I don't fully understand.

Reich (2012) observes that while news beats may differ in certain respects, such as sourcing standards or number of sources per story, there are still strong similarities between beats across the profession. For routine reporting, my subjects, without exception, adhered to the statistical conventions of the topic areas they covered. Their decisions about trust derived from this common norm. This means reporters who covered budgets and budget politics did not inquire into how figures are gathered, the sources from which they arose, or the origins behind the accounting conventions by which different groups of figures are combined or broken out. Rather, they were comfortable working within the assumptions that give public budgets their official meanings.

The same was true of reporters covering business. Subject 7, a freelance business journalist, believed business figures are generally honest and misstatements are rare aberrations: "You can't fake it; the sales are the sales." Similarly, Subject 19 stated, "The beauty of it is, of business, is that everything is quantified numbers." Both journalists took for granted the existing set of expectations about what business statistics, such as filings with the U.S. Securities and

Exchange Commission or quarterly profit and loss reports should mean. Subject 19 trusted the methodology because he considered it very professional and very stable. Despite the fact that both journalists recognize that business metrics change, they appeared to grant these sources a degree of unquestioned trust they probably would not have granted a human source.

These qualities fit well with the newsroom demand that beat reporters produce a regular flow of stories. For business reporters, the information and resource asymmetry between journalists and accountants makes an independent audit of a private enterprise impossible. For the same reason, it is not possible for a science journalist to test the reported results, and far less so to question the theoretical thinking that justifies a particular research design. It is also not clear that the audience expects such things from daily news. Scientific methodology, the conceptual basis for determining what to measure and what counts as “good” measurement, is normally invisible to journalists (and audiences) unless a major scientific controversy, such as different metrics for detecting climate change, makes it visible.

These methods of analyzing numbers represent a highly particular way to establish claims about what is true or newsworthy. On one hand, the beat-oriented conventions of budgets and business reporting may be examples of Fishman’s (1980) argument that “no newspaper fact can be asserted independently of some competent knower or observer” (p. 93). This requires reporters to concern themselves with the assumed competence of the news source but not necessarily the procedure whereby the source arrived at a truth assertion. Unlike what researchers have found about most human sources, the verification of regularized or highly professional numbers, such as economic statistics, does not appear to be governed by the social relations so critical to most journalistic source-building processes (Shapiro, 1987).

While this finding was broadly consistent, the interviews revealed many cases where individual journalists took it on themselves to question official statistics. Subject 13, an environmental investigative reporter, described his work for a story about toxic underground chemical plumes:

> It isn’t like I look at it, in the two seconds I understand it. I’ve got to look at it for a few minutes and maybe spend an hour really kind of looking at it, comparing the data points in this chart to data points in the map, that was also given to me as a map…*(sorts through maps)* the little red dots correspond to different…here is the Production Well, is PW3 it’s right there. Different monitoring wells so you look at this and you compare, you spend some time looking and you can kind of get a picture of okay, there is a plume of chemicals that is somehow headed this way and its getting over here. And the question is, is this, the only source, or is there another source of here that’s contributing to high levels of contamination in these wells.

This is evidence of how individual journalistic initiative may create an independent basis for establishing trust in numbers that still fits within journalistic norms. While the system of beats, deadlines, and the demands of daily news production frequently make it difficult for journalists to treat authoritative numbers as other than transparent, a small number of journalists may find opportunities for getting close enough to the sources of statistics to understand their construction and sometimes question them. An example, worth citing at length, is Subject 12’s recognition of the problem with interpreting FBI uniform crime figures:

> We are journalists so we are skeptical, and I trust them about as far as I know things about them. So for instance if you want to use that same thing to qualify how Detroit- how violent Detroit is, well you can’t.
>
> Q. Why not?

A: Because the city of Detroit doesn't report their numbers. So, what you could do is ask Detroit directly for their numbers and then analyze them the same way that the FBI does and then compare them. But then are you really using the same process that the FBI does, maybe, maybe not. So in that way it's- you can't really trust the numbers to tell an accurate story because if you sort it and look where Detroit is, Detroit will be the safest in the country because they're not on there…It's basically a detractor from the integrity of the data, right?

Q: What do you mean by the integrity of the data?

A: Well, in that specific example, Saginaw is the third most dangerous city, according to this data. Well, yeah but that doesn't count Detroit, which maybe, if it was analyzed the same way perhaps, Detroit would have been second most and that would have pushed Saginaw to fourth most and there's other communities also that aren't reporting on there. We are limiting it to cities of a certain size if you include cities down to the population of one; it dramatically changes the data because in a city of 50 where there was murder that year, that number is going to be much higher than any of the large cities' numbers. So, I mean in that way, we are manipulating the data to produce the result we think is most fair, whether we are doing that like a statistician would, probably not. I think we are doing it like a journalist would.

Q: How did you reach your conclusion about what's the most fair way to report it?

A: Partially on past practice of ourselves and others, and then partially on discussion, right? You have to cut off the population size somewhere, unless you want to include the, the low end data, skews the story…And so we did it at a point that seemed the [most] reasonable…a medium to large size city being the city of 50,000 or more.

Q: Are you concerned at all that when you decide what's reasonable you're making value judgments?

A: It's all value judgments, year absolutely.

By the standards of most beat reporters, this represents a highly nuanced insight into statistical construction, including what Starr and Alonso (1987) refer to as "tolerance of methodological inadequacies that yield data with useful political effect" (p. 38). Detroit's statistical blackout, in other words, may have been permitted because it served a political purpose for the city's leaders. This way to establish trust in numbers has not been well studied by the literature on source trust. It is a rare example of a case in which a journalist has become familiar enough with the internal components of number construction−such as motives for creating numbers or the organization of the counting process−to establish base trust or distrust on independent knowledge rather than the social credibility of the source. This reporter's views still do not represent what might be called a complete picture of crime, though, if only because it accepts the category definitions implicit in the statistical model. As in the case of the business reporting, it does not represent a failure of professional skill (which was exceptional) but a challenge to the idea that numbers in news represent "just the facts."

4.2.4 Trust in Numbers

The differing attitudes toward statistical transparency bear directly on questions of how journalists verify numbers or trust their validity. Knowledge measured and operationalized a certain way can make it difficult to recognize the existence of alternative systems for conceptualizing categories and measuring them (Fishman, 1980). But as the above examples demonstrate, journalists can sometimes develop a degree of skepticism about numbers, based

partly on the right circumstances. For my subjects, this sometimes happened on high-end investigative work; sometimes on beat reporting that gave subjects sustained exposure to the details of number construction. Frequently it did not happen at all.

Porter (1996), discussing the general phenomenon of trust in numbers, says it has both a psychological and an instrumental component. Numbers appeal to officials who use them in decision making to avoid the appearance of arbitrariness, once again serving purposes that go beyond the value of measured empirical knowledge. While quantification is functionally suited to creating and propagating forms of knowledge that go beyond particular communities, this "struggle against subjectivity" (Porter, 1996, p. ix) has an appeal beyond the practical, even when controversial, news from official authority is still guaranteed a serious or at least a respectful hearing. This protection from the appearance of arbitrariness gives numbers an appeal beyond the practical as well as a structural advantage in the creation of "straight news" (Fishman, 1980), reinforcing both the authority on which journalists rely and the norm of relying on authority in the first place.

4.2.5. Statistics as Culture: The Role of Context

Some researchers (Berman & Milanes-Reyes, 2013; De Santos, 2009) have recognized that numbers can have various meanings in different environments. Journalists frequently use the term "context" in describing similar aspects of their work. Coddington (2014), discussing the profession's efforts to define its core values against the encroachment of nonprofessionals in digital mass communication, pointed out that newswork goes deeper than professional routines, it also strives to incorporate the knowledge building practices those routines serve. News judgment, as one of these, is sometimes treated by journalists as "common sense" although both Schudson (1989) and Tuchman (1972) have shown how news judgment is also grounded in cultural assumptions about reality–which are probably uncontroversial in part because they are shared by audiences. When my subjects explained their search for context for numbers used in their reporting, they usually referred to the range of closely related references, frequently other numbers, used to show connections between the numbers judged as newsworthy and other numbers, of which they form a single class, and from which they emerged. This sometimes varied by beat. Subject 19, covering the auto industry, used a limited range of context providers such as industry experts and measures of consumer confidence. Subject 6 was puzzled by the unusually high percent of hospital births in her state paid by Medicaid. Unfamiliar with this topic, she sought out an expert at her state's Department of Health who explained how requirements of the Medicaid law mandated keeping large numbers of women on Medicaid temporarily just after giving birth.

As noted previously, reporting efforts almost always took place within the category definitions—that is to say, the algorithms—created by the experts and specialists who computed the statistics. This exposes journalists to the charge of normalizing existing systems of knowledge creation, rendering them natural and invisible. A few journalists doing investigative work occasionally compiled their own databases. Subject 2, analyzing hospital data for patterns of infection related to drug use, borrowed a methodology developed for an academic study without investigating the reasons behind it, stating: "So is that a value judgment? Absolutely it is." He solved this problem by including a box explaining the methodology. However even this reporting could not escape problems of trust entirely as long as it relied on an existing methodology without investigating its underlying basis.

5. CONCLUSIONS, LIMITS AND SUGGESTIONS FOR FURTHER RESEARCH

5.1 Conclusions

The use of empirical, verifiable forms of measurement and counting are so widespread in modern journalism as to constitute a defining feature of the institution (Curtin & Maier, 2001; Harrison, 2016). As McConway (2016) asks, "If statistics are so boring, why are the newspapers so full of them?" (p. 51). The goal of this study was to better understand this apparent paradox by discovering how statistics function in the minds and decision making of one of the key newsroom actors, including the question of establishing trust.

Some of this number dependence grows out of newsroom values and practices, particularly the reliance on official authority. This reliance has sometimes been treated by investigators like Fishman (1980), Sigal (1973), and Tuchman (1972) as an ideological convention of the journalistic social system, with the heavy dependence on numbers as part of it. However it may also grow out of the confluence of interests between journalists and officials: journalists need routine sources, information whose accuracy or reliability can be depended upon, while a critical part of the work of public officials involves the routine creation of certain kinds of measured knowledge (Fishman, 1980). This creation in turn contributes to the cultural authority of numbers as a special kind of truth (Porter, 1996), particularly in the public sphere which is the subject of a great deal of news reporting—which then feeds back into the journalistic demand for information in the form of statistics. The processes, in other words co-create and reinforce each other. This codependence may create an psychological incentive for journalists to trust numbers.

The cultural authority of numbers is not normally visible to journalists. What they see is that they cannot work without numbers and are expected to pursue them as fully as they can, in ways that meet the norms and values of the newsroom. For much routine reporting on short deadlines, this works in prescribed ways that are congruent with what sociologists have discovered about the power of professional norms, expectations, and routines on the creation of news (cites?). Journalists do not automatically trust all numbers; they frequently do not. But for a variety of internal and external reasons, numbers are one of the knowledge claim categories through which both journalists and audiences expect the news to work.

In regard to journalists' understanding of how numbers and statistics are defined and gathered, (RQ1) all subjects interviewed understood the general principle that measurements are imperfect human artifacts subject to verification and fact-checking. Reporters who covered a beat relied on the measurement conventions of the actors and institutions who functioned as their sources. Trust, skepticism, and the process of verification or falsification of statistics took place within these conventions, consistent with Reich's (2012) conclusion that the commonalities between beats are greater than their differences. This kind of generalized trust appears to contain both reasoned and nonreasoned elements (Reich, 2011). The investigative reporters were the only subjects who ever questioned the measurement norms of their sources and occasionally searched for alternatives. This sometimes allowed them a measure of independent judgment about the accuracy, completeness and meaning of statistics.

Journalists were always aware of their status as professionals working with other professionals to broad but generally agreed on standards and procedures for finding and verifying news and turning it into editorial product (RQ2; RQ3). There were no exceptions. Disagreements were confined to such matters as an appropriate test or standard of verification,

but never about the appropriateness of professional journalism as a means of finding facts. The subjects frequently took initiative and had wide latitude to make their own decisions but always within the paradigms for fact-finding established by the institution. Part of each individual journalist's task in writing the story was to negotiate the difference between their sources' conceptualization of what truth claims meant and that of the news organization.

With regard to RQ4, (how numbers gain legitimacy), almost all subjects treated numbers as legitimate when they came from official or authoritative sources. Methods of counting and the conceptualization and definition of categories were defined by the authorities on whom the journalists relied; for example business reporters accepted concepts of profit and loss as defined by existing accounting conventions, with data supplied by the businesses themselves. Accuracy could be questioned but not the legitimacy of the authority.

5.2 Limitations and Suggestions for Further Research

As a qualitative report, this study was confined to a relatively small, nonrandom number of subjects. The subjects also skewed toward journalists with greater experience. Journalists less socialized into professional norms might have had different attitudes toward the transparency of numbers generally. This is important because of the repeated findings that journalists' performance with numbers could use improvement, both in their thinking and their finished stories (Ahmad, 2016; Brand 2008; Maier 2002; McConnell, 2014; Moynihan et al., 2000). These problems are troublesome because they persist no matter how nuanced the attitudes of individual journalists that emerge in interviews. Martin (2016) recognized that journalists frequently lack the learned habit of journalistic skepticism when dealing with numbers. Thus, the mishandling must be occurring somewhere, the result of some continuing process or pattern that requires further investigation to reveal.

It is significant that the data showed an unusually high degree of consistency for a qualitative study. Some areas−such as the belief that all knowledge claims could be resolved, however imperfectly, within the existing journalistic system−exhibited no disagreement at all. Disagreements that surfaced were less in the nature of negative cases than they were different responses to various conventions for handling numbers across the sources in particular beats, such as the difference between journalists covering scientific studies and journalists covering government budgets.

At least four other methods could extend this research. First, newsroom ethnographies could follow a single story or multiple stories through all stages of development. Second, journalism textbooks and craft books, particularly those that deal with numerical reporting, could be content analyzed to see if their conceptual categories for numbers and numbers reporting align with the findings of this study. Third, a representative sample of stories containing statistics could be content analyzed to determine whether the use of statistics conforms to expected conventions for a given beat and whether there is a pattern to the acceptance of official numbers vs. a search for alternatives. Fourth, journalists could be surveyed to determine whether there is a correlation between subjects' closeness to or distance from numbers on a beat and their belief or disbelief in the transparency of numbers.

Beyond these extensions of present research lie further questions about the role of statistics in the media in what Schudson (2014) calls a structurally changed democracy. A great deal of statistical production is part of what political science (Waldo, 2006) labels the administrative state. This raises questions about how media could report more meaningfully on

the state activities that produce official numbers, which currently escape public notice unless they become controversial, as well as how democracy would function if media were able to convey a more informed knowledge of the role of numbers in the news. Some of the research questions this concept raises include:

- How difficult is it to challenge or dispute numbers once they become widespread in the media?
- What role do journalists play in the process by which particular statistics become the subject of continuous high-profile attention?

Some of the ways in which statistics are regarded or thought about in the newsroom may also produce different effects on audiences. Two additional research questions this raises are:

- How do decisions about which numbers to trust (and therefore report) contribute to the agenda-building process?
- Do differing understandings of numbers among journalists measurably affect the framing of stories?

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