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Multiplicity and uncertainty: Media coverage of autism causation

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ABSTRACT

Employing the machine learning method, this study analyses 6504 articles from four major newspapers, *New York Times*, *Washington Post*, *USA Today*, and *The Guardian*, to examine how media cover the topic about causes of autism. A total of 14,305 causal sentences on the topic are extracted from media articles and subjected to analysis of causal entities and descriptions. Results show media have presented multiple factors (e.g. vaccination, genetics, and parenting) pertaining to the causes of autism, as well as multiple symptoms of autism. Most of those causal relationships are presented in a tentative or uncertain manner. The study also reveals significant differences in reportage of autism causation across time and media channels.

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1. Introduction

Over the past decades, the field of autism spectrum disorders (ASDs) has been expanding and the volume of relevant scientific publications has been growing exponentially (Matson & LoVullo, 2009). Among the broad category of ASDs, autism is most intensely studied, followed by Rett Syndrome and Asperger's Syndrome. Meanwhile, finding the causes and potential cures for autism has become a spotlight topic for media coverage (McKeever, 2012). The growing media attention to the ASD is echoed by scientific statistics reporting that autistic cases have increased by 20-fold over the last two decades (DSM-5, 2013 Diagnostic and Statistical Manual of Mental Disorders, DSM-5).

Although using experts' judgments or meta-analyses of academic publications may help locate potential causes of ASD too, inspecting newspaper coverage on the causes of autism is of unique and tremendous values. Concretely, popular media remain to be a pivotal information source that parents rely on in making a decision on the treatment for autism (Miller, Schreck, Mulick, & Butter, 2012). Recently Schreck, Russell, and Vargas (2013) reported that more than 75% treatments of autism mentioned in print media (e.g., newspapers and magazines) are not scientifically supported. Examining newspaper coverage, as such, will provide insight into information which may significantly affect parents' decision on treatment for autism.

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The mutual relationship and influence between scientific research and media coverage, however, could be complicated and consequential. For instance, [Phillips, Kanter, Bednarczyk, and Tastad \(1991\)](#) found the coverage of medical research in the *New York Times* significantly boosted the visibility of academic research, which subsequently received much higher attention in terms of citations from the scientific community. The authors further admonished that popular media coverage of scientific research could be enhancing or distorting the transmission process of information flowing from academia to other communities.

In light of the longtime controversy around autism, it is particularly meaningful to examine how media cover a health issue of the like. Such a research endeavor will enhance the understanding of how media communication may present, either in a neutral or biased manner, scientific research on autism. A cursory review of existing literature reveals that little research had been undertaken to investigate media coverage of the etiology and consequences of autism, and existing research on the topic is typically limited to a small sample of media articles ([Clarke, 2008](#)). The present study therefore focuses on how media cover different causes of autism, and furthermore how such coverage may vary across time and media sources.

Employing the method of machine reading (e.g., OpenIE), we explore the patterns of reportage on the etiology of autism in a more comprehensive manner. With a dataset much larger than those used in prior media content analysis (e.g., [Clarke, 2008](#)), our study may provide insight into the cause-and-effect issues of autism as portrayed in media. The study may thus serve as a stepping stone for bridging the gap of understandings on ADS between the scientific community, media professionals, and the general public. More importantly, as an interdisciplinary study of information science and communication, the adoption of machine reading for knowledge mining provides a new perspective for understanding information dissemination and cognitive construction.

We begin with a review of relevant literature on ADS causation and media coverage, including linkage to autism, and the development of machine reading. We then introduce our research questions and explain the machine-learning method employed in the current study. We present our results in a textual and visual manner, and finally, interpret the implications of our research findings in reference to research literature and media practice. We conclude the study with research limitations and future directions.

2. Related work

2.1. Causations and consequences of autism

The etiology, causation, and consequences of autism have long been contested and controversial ([Currenti, 2010](#)). As [Newschaffer et al. \(2007\)](#) commented, the causal mechanisms underlying autism have not been well studied or understood. As a result, different groups or communities of people may hold varying and even conflicting views on the causes and consequences of autism. For instance, [Mercer, Creighton, Holden, and Lewis \(2006\)](#) surveyed 41 parents with autistic children, and summarized the parental perspectives on causes of autism, where reported causes of autism were ranked as: genetic influences (90.2%), perinatal factors (68.3%), diet (51.2%), prenatal factors (43.9%), and vaccines (40.0%).

In the scientific community, researchers have also explored a variety of factors in autism causation, such as socio-economic background, and genetic and environmental influences. [McKeever \(2012\)](#), after content-analyzing the *New York Times* and the *Washington Post*, found that science frames (i.e. discussing the genetic, biological, and environmental causes and effects of autism) were prevalent in the early years of news coverage of autism. The prevalence of scientific frames has remained largely consistent, though it shows a slight decrease across time. The authors further ascribed this prevalence to the fact that scientists have not identified the exact cause or causes of autism. In addressing the history of “autism blame” ([PBS, 2002](#)), for example, earlier conceptualizations of autism causes featured psychogenic factors such as emotional distance or coldness of parents (notably “refrigerator mothers” and absent fathers). Those factors contribute to a distinct neurological disorder identified by [Leo Kanner in 1943](#) as “Early Infantile Autism,” which he incorrectly associated with high-income, white families.

An important long-term task is to explore and understand how genetic and environmental factors contribute to autism ([Currenti, 2010](#)). Researchers have examined a wide range of genes for potential associations with the condition, though, none has been replicated or confirmed as a definitive autism gene ([Newschaffer et al., 2007](#)). Similarly, the linkage between autism and environmental factors has attracted increasing research attention, especially in light of increased environmental toxins. Yet little evidence has been accumulated to confirm that linkage ([Currenti, 2010](#)).

Factors compounding the understanding and conceptualization of the condition are also diverse and complex. For instance, [Gernsbacher, Dawson, Goldsmith \(2005\)](#) pointed out that the changing diagnostic criteria, along with other factors, are leading to further misunderstandings or disagreements of autism’s causes. [Verhoeff \(2013a, 2013b\)](#) reviewed historical changes in autism and divided the period into three stages: affective aloofness and withdrawal, language and cognitive abnormalities, and deficits in intuition and social cognition. The author contended, however, that the definition of autism is not fixed but rather is constantly in flux. The various conceptualizations and diagnostic criteria, among other factors, exert significant influences on the quality and conclusion of different studies. As a result, even scientific researchers are not able to reach a consensus on the causation and effects of autism. The controversial nature of the conditions, causes, and related issues also complicates and diversifies how ADS is handled by the media.

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