



Does correcting myths about the flu vaccine work? An experimental evaluation of the effects of corrective information



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ABSTRACT

Seasonal influenza is responsible for thousands of deaths and billions of dollars of medical costs per year in the United States, but influenza vaccination coverage remains substantially below public health targets. One possible obstacle to greater immunization rates is the false belief that it is possible to contract the flu from the flu vaccine. A nationally representative survey experiment was conducted to assess the extent of this flu vaccine misperception. We find that a substantial portion of the public (43%) believes that the flu vaccine can give you the flu. We also evaluate how an intervention designed to address this concern affects belief in the myth, concerns about flu vaccine safety, and future intent to vaccinate. Corrective information adapted from the Centers for Disease Control and Prevention (CDC) website significantly reduced belief in the myth that the flu vaccine can give you the flu as well as concerns about its safety. However, the correction also significantly *reduced* intent to vaccinate among respondents with high levels of concern about vaccine side effects – a response that was not observed among those with low levels of concern. This result, which is consistent with previous research on misperceptions about the MMR vaccine, suggests that correcting myths about vaccines may not be an effective approach to promoting immunization.

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1. Introduction

In the United States, seasonal influenza is responsible for thousands of deaths and billions of dollars in medical costs and lost earnings annually, but immunization rates remain substantially below the targets in *Healthy People 2020* [1,2]. In 2011–2012, for instance, only 33% of adults aged 18–64 were vaccinated – far short of the *Healthy People 2020* target of 80% for adults [1].

One possible impediment to higher vaccination rates is the false belief that the influenza vaccine can give people the flu. Health agencies often attempt to correct this false claim, which may contribute to perceptions that the vaccine is unsafe or exacerbate hesitancy about immunization [3]. However, previous research in non-medical contexts suggests that correcting factual misperceptions may be ineffective and can even make false beliefs more prevalent due to people's motivations to defend their prior beliefs [4]. Similarly, corrective information is also often ineffective at changing opinions [5–7]. Most notably, though debunking the myth

that the measles, mumps, and rubella (MMR) vaccine causes autism was found to successfully reduce belief in that false claim, it also *reduced* vaccination intent among parents with the least favorable attitudes toward vaccines [8]. Similarly, exposure to accurate information about the vaccine for diphtheria–pertussis–tetanus (DPT) was associated with non-vaccinators seeing the vaccine as less dangerous but also making them feel less inclined to vaccinate [9].

In this article, we report the results of a nationally representative survey experiment examining the prevalence of the myth that the flu vaccine can give people the flu and test whether correcting this myth reduces belief in the misperception, increases perceptions that the flu vaccine is safe, and increases vaccination intent. We compare the effect of corrective information with an alternate message about the dangers of the flu as well as a control condition in which respondents were not given any information.

2. Methods

2.1. Data collection

The data for this study were collected as part of the 2012 Cooperative Congressional Election Survey, a multi-investigator online study that primarily focused on questions about politics and

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government. The survey was fielded in two waves – a pre-election wave in October 2012 and a November 2012 post-election wave for respondents from the first wave (as we discuss below, however, this wave suffered from significant non-random attrition).

Respondents were U.S. adults drawn from the YouGov/Polimetrix PollingPoint Panel and the E-Rewards and Western Wats panels. These respondents were matched and weighted to approximate a national probability sample using the YouGov/Polimetrix sample matching methodology [10], which has been shown to perform well in predicting the outcome of U.S. elections and was recently adopted by the *New York Times* [11]. The final sample for the module included 1000 respondents who participated in the first wave of the study (822 of these accepted the invitation to complete wave 2). The response rate for wave 1 was 33.4% of the participants in the panels listed above who were invited to take part in the study (American Association for Public Opinion Research response rate 1) [12]. This study was designated as exempt from human subjects review by the Dartmouth Committee for the Protection of Human Subjects (CPHS #23722). Respondents provided informed consent before participating; no adverse events were reported.

2.2. Study design

Respondents were randomly assigned to one of three different conditions in our experiment, which allows us to make credible causal inferences about their effects of the messages tested. In each condition, respondents were asked questions about the flu vaccine and whether or not they intended to get vaccinated. One group of respondents received information debunking the myth that people can contract flu from the vaccine (*Correction*). A second group of respondents received information about the risks posed by influenza, a standard type of pro-vaccination information that was included to provide a comparison measure of messaging effectiveness (*Danger*). Finally, a third group of respondents received no additional information about the flu or flu vaccines prior to answering the outcome questions (the control group). Each respondent was assigned to only one condition and saw no other messages about the flu or vaccines.

Each of these messages was taken nearly verbatim from the CDC website. In the *Correction* condition, which is adapted from the CDC web page “Misconceptions about Seasonal Flu and Flu Vaccines” [3], respondents were told that people cannot contract flu from the flu shot or live virus nasal spray. In the *Danger* condition, which uses text from the CDC web page “Key Facts about Influenza (Flu) and Flu Vaccine,” respondents were informed that flu is a contagious illness, provided with a list of its signs and symptoms, and told about the serious risks it poses. (The text of each intervention is provided in online Appendix A.)

Responses to information about vaccines may vary depending on pre-existing attitudes toward vaccines. It was not possible to accurately measure prior vaccine receipt in this study due to concerns about error in self-reports of past behavior. In addition, prior receipt may also not accurately reflect an individual’s current beliefs and attitudes. We instead measured participants’ general concerns about vaccine safety and possible side effects, which may contribute to beliefs in specific vaccine myths (and rejection of corrective information about them) as well as vaccine hesitancy [8]. Specifically, we asked, “In general, how concerned are you about serious side effects from vaccines?” prior to administering the interventions. Respondents answered on a five-point scale ranging from “not at all concerned” to “extremely concerned.” We expected responses to this question to moderate the treatment effect of interest because the corrective information in our study concerns a perceived side effect of vaccines. Specifically, our expectation is that respondents who are most concerned about side effects are

most likely to resist corrective information intended to alleviate those concerns.

Approximately a quarter of the sample (24%) answered that they were either “extremely concerned” (11%) or “very concerned” (13%) about side effects from vaccines. In the analyses that follow, this group, which is the most concerned about vaccine side effects, is referred to as the high concern group. The remaining respondents are classified as low concern.

2.3. Outcome measures

After the experimental intervention, we assessed the effects of *Correction* and *Danger* on respondents’ misperceptions about the flu vaccine, beliefs about flu vaccine safety, and intention to get vaccinated using three outcome measures. Misperceptions about the flu vaccine were measured by asking respondents whether the statement “You can get the flu from the seasonal flu vaccine” is accurate. Respondents’ general beliefs about the safety of flu vaccines were measured by asking “Just based on what you know, how safe do you believe the seasonal flu vaccine, meaning the flu vaccine available every year, is generally for most people to take?” Responses to both questions were measured on a four-point scale. We also asked respondents “How likely is it that you will get a flu vaccine for the seasonal flu during the upcoming flu season (fall 2012–spring 2013)?” and measured their reported intention to vaccinate on a six-point scale. (The full text of each measure is provided in online Appendix A.)

These measures were included due to the complexity of the relationship between attitudes and behavior [13]. They allow us to understand the effect of debunking the myth that the flu vaccine causes the flu on both people’s beliefs and their intended behavior. As we show below, the correction turns out to have different effects on people’s beliefs about the vaccine than on their intention to vaccinate. If we only measured effects on beliefs, we might have mistakenly concluded that corrective information is an effective way to address vaccine hesitancy. Because we also asked about intention to vaccinate, however, we can show that the correction actually reduces intention to vaccination and that this effect is concentrated among respondents with high levels of concern about vaccine side effects.

2.4. Waves

The *Danger* and *Correction* messages were administered only in Wave 1 of the survey. All outcome measures and the side effects concern question were asked in Wave 1 and Wave 2. We asked these outcome measures in both waves in the hopes of assessing whether the treatments had both immediate and lasting effects. As we discuss below, however, wave 2 suffered from significant non-random attrition, especially among respondents with high vaccine side effects concern. As a result, it cannot yield valid inferences about the effect of the treatments given the role of side effects concern as a moderator, though we present these data for completeness in online Appendix B (we discuss these results further below).

2.5. Statistical analysis

The results from the study were analyzed using ordered probit in Stata 13 (Stata Corp, College Station, TX) and incorporate probability weights provided by YouGov to approximate a nationally representative sample (Results using OLS are substantively identical and are available upon request). We estimate the effects of assignment to the *Correction* and *Danger* conditions on misperceptions about the flu vaccine (an “intent to treat” effect). In our analysis below, we consider the possibility that responses to messages about vaccine safety or the dangers of communicable disease

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