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Is the worship of celebrities associated with resistance to vaccinations? Relationships between celebrity admiration, anti-vaccination attitudes, and beliefs in conspiracy

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ABSTRACT

Vaccinations and anti-vaccination attitudes have reclaimed the spotlight as a crucial health behavior because of the recent surge in outbreaks of preventable diseases. One factor that may be contributing to this trend is the outspoken role that anti-vaccination celebrities play. The main purpose of the present study was to determine whether anti-vaccination attitudes are related to celebrity admiration. We hypothesized a positive correlation between anti-vaccination attitudes and celebrity interest and admiration. We also hypothesized that persons who are very concerned about the commercial profiteering of vaccinations will also tend to believe in conspiracies. Participants ($N = 320$, 40% female, mean age = 36.28, $SD = 11.32$) completed the Celebrity Attitude Scale (CAS) and the Vaccination Attitudes Examination Scale (VAX) through an online survey management system. We found significant positive associations between anti-vaccination attitudes and celebrity admiration and interest. However, celebrity admiration and interest did not correlate with mistrust of vaccine benefits, as measured by a subdomain of the VAX. Additionally, we found that concerns about commercial profiteering from vaccines correlated with beliefs in conspiracy theories. Our study suggests a new way of approaching people's anti-vaccination attitudes that may be used to effectively educate the public about the importance of vaccinations.


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Anti-vaccination attitudes; celebrity admiration; vaccines; vaccination attitudes; conspiracy theories

Vaccinations and anti-vaccination attitudes have reclaimed the spotlight as a crucial health behavior because of the recent surge in outbreaks of preventable diseases. For example, there have been 1,249 reported cases of measles in 31 of the 50 states that comprise the United States of America from January 1 to 26 September 2019; 89% of those cases involved unvaccinated or had unknown vaccination records (Centers for Disease Control and Prevention, 2019). Despite these alarming statistics, people continue to maintain anti-vaccination attitudes and fail to vaccinate themselves and their children. One factor that may be contributing to this trend is the outspoken role that anti-vaccination celebrities play. The current study examines the direct relationship between celebrity admiration and anti-vaccination attitudes.

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In this paper, we define a celebrity as someone who is well-known and is perceived by people to have produced ideas or objects that have had an impact on society, even for a short period of time (North et al., 2005). Famous persons can be from many different categories, but previous research suggests that actors, musicians or athletes are selected by participants about 75 to 80% of the time (e.g., McCutcheon et al., 2016). Previous studies have found that celebrity admiration is related to personality, demographic, or attitudinal variables, and even poor mental health (see Brooks, 2018, for a review). However, no one has attempted to determine if attitudes toward one's favorite celebrity or attitudes toward celebrities in general are related to attitudes about vaccination.

There is some evidence suggesting that persons who are strongly attached to a favorite celebrity and/or celebrities in general, might be opposed to vaccination. Some of this evidence stems from several anecdotal reports of prominent media stars who have openly stated their opposition to vaccination (Antrim, 2019; Geraghty, 2019; Roberts, 2018). Moreover, Dickson (2019) listed and commented on 17 celebrities who have publicly denounced vaccinations, Shapiro (2018) criticized a popular magazine aimed at young parents for printing an article citing the anti-vaccination opinions of several celebrities, and McIntosh (2015) provided numerous examples of how celebrities can influence people by spreading misinformation and advocating unhealthy practices.

Critics might ask: Why is this issue important? The answer is that anti-vaccine celebrities have an inordinate amount of influence (Antrim, 2019), and they are wrong about vaccines (McIntosh, 2015; Roberts, 2018). Additionally, there is evidence to suggest that people view celebrities as more credible than medical experts and with the media as a primary source of information for people, celebrity culture can have harmful impacts (Caulfield & Fahy, 2016; Emmers-Sommer & Teran, 2019). Researchers have argued that relying on celebrities for advice about topics for which the celebrities have no training is ill-advised (McCutcheon et al., 2004). Furthermore, the failure to vaccinate can result in serious illness or death, and there is no serious debate among medical experts regarding the effectiveness of vaccines (Antrim, 2019; Motta et al., 2018; Roberts, 2018).

Is it possible that the influence of anti-vaccination celebrities has been overestimated by the reporters cited above? Hoffman and Tan (2015) pointed out that some celebrities have endorsed mandatory vaccination programs. In a large nationwide, representative sample of parents, 22% reported that they trusted celebrities at least somewhat for advice about the safety of vaccines, and 2% trusted celebrities a lot (Freed et al., 2011). Motta et al. (2018) found that overconfidence about one's knowledge about autism was associated with opposition to mandatory vaccination and increased support for the role that celebrities play in making policy about vaccinations.

A major step forward in our understanding of anti-vaccination attitudes was the development and validation of the *Vaccination Attitudes Examination Scale* (VAX; Martin & Petrie, 2017). This scale has four subscales, allowing for a more nuanced study of the reasons why some persons oppose vaccination. The authors did a credible job of validating the VAX, but the validation of any psychological measuring instrument is an ongoing process. One of these subscales, 'Concerns about commercial profiteering,' strikes us as a concern about the possibility of a conspiracy designed by government officials and the pharmaceutical companies to make huge sums of money by requiring everyone to get vaccinated. An item from this subscale, 'Authorities promote vaccination

for financial gain, not people's health,' implies a massive conspiracy on the part of authority figures.

There is some reason to believe that there might be a link between the anti-vaccine movement and a general belief in conspiracies. Dickson (2019) cited a well-known celebrity who claimed that he will not get vaccinated because he does not trust the government. Geraghty (2019) cited the father of a child who has not been immunized as saying that the big pharmaceutical companies are paying off government officials to suppress the truth about vaccinations. Roberts et al. (2005) found that some of the participants in their study of beliefs about vaccination subscribed to one or more conspiracy theories about vaccination. Additionally, British parents who resisted vaccination also tended to believe in conspiracy theories (Jolley & Douglas, 2014). As part of the continuing effort to validate the VAX we will compare scores on the 'Concerns about commercial profiteering' subscale with a brief measure of beliefs in conspiracies.

We hypothesize a positive correlation between scores on VAX and scores on both the *Celebrity Attitude Scale* and the single item 'How would you rate your interest in celebrities generally?' In other words, we believe that as people's opposition to vaccines increases, so will their attachment to their favorite celebrity and to celebrities in general. We also hypothesize that persons who are very concerned about the commercial profiteering of vaccinations will also tend to believe in conspiracies.

Method

Participants

Participants ($N = 320$) were recruited from Amazon Mechanical Turk (MTurk), a popular online platform where people are paid for completing tasks. MTurk is widely used in social sciences research because MTurk participants perform just as well on study tasks as participants who are recruited via social media and participants who complete studies in person, while being more socio-economically and ethnically diverse (Bartneck et al., 2015; Casler et al., 2013). The representativeness of MTurk participants to the United States of America's general population (Paolacci et al., 2010) is especially important for this study because the study examines issues that are relevant and salient to people in the community. However, one report suggests that inattentiveness is an issue among MTurk workers (Aruguete et al., 2019) and another noted a concern with MTurk data security (i.e., 'bots'; Dennis et al., 2020). In this study, we limited these issues by following suggested data screening measures in those reports.

Participants were eligible to participate if they were 18 years old or older and lived in the United States of America. They were paid .75 USD (75 cents) to complete the study. The average age of the participants was 36.28, $SD = 11.32$. Forty percent were female and 69.1% were white/Caucasian, 16.6% Black/African American, 5.3% Asian/Pacific Islander, 4% Hispanic/Latino, 4.1% mixed.

Procedure

Participants clicked on a link for the online study, which took them to the consent page containing information about the study. Following consent procedures, participants completed the study questionnaires. The order of the questionnaires was randomized

to reduce potential order effects. Following the questionnaires, participants completed demographic questions.

Measures

The *Celebrity Attitude Scale* (CAS) consists of 23 items, and has been shown to have good psychometric properties over the course of several studies (see Griffith et al., 2013; McCutcheon et al., 2004; Zsila et al., 2018). The response format for the CAS is a 5-point scale with anchor points ‘strongly agree’ equal to 5 and ‘strongly disagree’ equal to 1. The scale measures three aspects of celebrity worship that were identified through factor analysis (McCutcheon et al., 2004). The first of the three subscales addresses *Entertainment-Social* (ES; 10 items). On this level, shown to be relatively benign (Maltby et al., 2011), persons are attracted to their favorite celebrity because he or she provides entertainment and a vehicle for making contact with friends. The *Intense-Personal* (IP; 9 items), is more problematic (Maltby et al., 2003), and reveals persons who have an intense attraction to their favorite celebrity that is not very healthy. The third level is *Borderline Pathological* (BP; 4 items), the reason for which is illustrated in this sample item: ‘I often feel compelled to learn the habits of my favorite celebrity.’ Across several studies total scale Cronbach alphas ranged from .84 to .94 (McCutcheon et al., 2004).

A single item that is frequently used in conjunction with the *Celebrity Attitude Scale* is ‘How would you rate your interest in celebrities generally?’ This item is followed by a seven-point scale anchored by ‘very weak interest’ (1) and ‘very strong interest’ (7). It has been shown to correlate .44 with the CAS (McCutcheon et al., 2004).

The *Vaccination Attitudes Examination Scale* (VAX) was developed to provide a general measure of attitudes relating to vaccination (Martin & Petrie, 2017). It consists of 12 Likert-type items divided into four subscales of three items each. The four subscales are: Mistrust of vaccine benefit, Worries about unforeseen future effects, Concerns about commercial profiteering, and Preference for natural immunity. Responses range from 1 (strongly disagree) to 6 (strongly agree), with high scores indicating a negative attitude toward vaccination. Test-retest reliability over a one-month interval was .84; and over the course of two studies, alpha reliabilities for the four subscales ranged from .77 to .93. The validity of the VAX was established by showing that high scorers tended not to have been vaccinated for influenza in the past year, and they tended to have refused any vaccination for their children. Furthermore, they indicated that they did not intend to get vaccinated in the coming year (Martin & Petrie, 2017).

Belief in Conspiracy Theories was measured using a single item scale: ‘I think that the official version of the events given by the authorities very often hides the truth.’ A score of 1 equals completely false, and 9 equals completely true (Lantian et al., 2016). For means, standard deviations, and Cronbach’s alphas for all scales and subscales, see Table 1.

Results

VAX and celebrity admiration

We conducted bivariate correlations to test our hypotheses. First, we expected to find a positive correlation between scores on the VAX scale and the CAS. Table 1 shows that

Table 1. Means, standard deviations, reliability, and correlations of study measures.

Variable	M _s	SDs	α	1	2	3	4	5	6	7	8	9	10	11
1. Celebrity Attitude Scale (Overall)	63.73	22.20	.96	1										
2. Entertainment-Social (ES)	31.21	9.07	.89	.93**	1									
3. Intense-Personal (IP)	21.85	10.18	.95	.95**	.79**	1								
4. Borderline Pathological (BP)	10.67	4.29	.81	.94**	.84**	.88**	1							
5. General Interest	4.19	1.86	-	.67**	.59**	.66**	.63**	1						
6. VAX Scale (Overall)	2.79	1.08	.94	.28**	.19**	.33**	.26**	.13**	1					
7. Mistrust of vaccine benefit	2.81	1.07	.89	-.08	-.16**	-.01	-.06	-.01	.68**	1				
8. Worries about future effects	3.01	1.28	.88	.23**	.19**	.25*	.22**	0.09	.89**	.48**	1			
9. Concerns – commercial profit	2.65	1.32	.91	.36**	.27**	.41**	.34**	.21**	.94**	.49**	.79**	1		
10. Pref. for natural immunity	2.73	1.37	.91	.39**	.29**	.44**	.36**	.24**	.87**	.44**	.71**	.83**	1	
11. Belief in Conspiracy Theories	5.72	2.19	-	.22**	.15**	.26**	.20**	0.07	.49**	.31**	.40**	.49**	.44**	1

N = 320. *Correlations are significant with $p < .05$ **Correlations are significant with $p < .01$

overall VAX positively correlated with celebrity total scores, $r = .28, p < .001$, which supports our first hypothesis. Additionally, overall VAX scores correlated with all three subscales of the CAS; Celebrity Entertainment-Social, $r = .19, p < .001$; Celebrity Intense-Personal, $r = .33, p < .001$; and Celebrity Borderline Pathological, $r = .26, p < .001$. Additionally, there were non-significant correlations between the VAX subscales and the CAS subscales worth noting. The VAX subscale of mistrust of vaccine benefits did not correlate with Borderline Pathological subscale, $r = -.05, p = .30$, nor the Celebrity Intense-Personal subscale, $r = -0.01, p = 0.80$.

VAX and general celebrity interest

We also predicted a positive correlation between scores on the VAX scale and general celebrity interest as measured by the single CAS item ‘How would you rate your interest in celebrities generally?’ We found that overall VAX scores correlated significantly with general celebrity interest, $r = .13, p = 0.01$. On the other hand, general celebrity interest did not correlate with mistrust of vaccine benefits, $r = -.10, p = .05$, and worries about unforeseen future effects, $r = .09, p = .12$.

Belief in conspiracy theories

In our third hypothesis, we hypothesized that people who are concerned about the commercial profiteering of vaccinations will also tend to believe in conspiracies. This hypothesis was supported. [Table 1](#) shows that concerns about commercial profiteering correlated with belief in conspiracy theories, $r = .49, p < .001$. Furthermore, belief in conspiracy theories correlated with Celebrity Entertainment-Social, $r = .22, p < .001$, and Celebrity Intense-Personal, $r = .25, p < .001$. We also found that total celebrity admiration scores correlated with belief in conspiracy theories, $r = .22, p < .001$. However, general celebrity interest did not correlate with belief in conspiracy theories, $r = .07, p = .20$.

Discussion

The purpose of the present study was to determine whether anti-vaccination attitudes are related to celebrity admiration. We found a significant positive association between anti-vaccination attitudes and celebrity admiration. This association aligns with previous claims that celebrities can have detrimental amounts of influence on their audience, especially celebrities who are publicly against vaccinations (Antrim, 2019; McIntosh, 2015; Roberts, 2018). This association suggests that people may be turning to celebrities for medical advice, which is consistent with previous findings that suggest that people view celebrities as more credible than medical experts regarding medical advice (Emmers-Sommer & Teran, 2019).

Additionally, we found that more serious forms of celebrity admiration positively correlated with anti-vaccination attitudes generally; however, correlations with subdomains of anti-vaccination attitudes reveal that more serious forms of celebrity admiration did not relate to mistrust of vaccine benefits. The lack of correlation between mistrust of vaccine benefits and celebrity admiration suggests that even people who admire celebrities in a more serious form still acknowledge that vaccines are beneficial. Additionally,

these results demonstrate that people with strong celebrity admiration are more concerned with the potential side effects, commercial profit of vaccines, and may prefer natural immunity. Thus, it may be important that messages and interventions aimed at changing vaccination attitudes, when it relates to celebrity admiration, focus on people's concerns about potential side effects of vaccines, fears about commercial profiteering, and preference for natural immunity instead of attempting to convince people that vaccines are effective.

We also found a positive correlation between anti-vaccination attitudes and a general interest in celebrities. However, we found that general celebrity interest did not correlate with the subdomains of mistrust of vaccine benefits and worries about unforeseen future effects. The null correlations suggest that general interest in celebrities may be associated with anti-vaccination attitudes, but general interest in celebrities does not contribute to a mistrust of the benefits of vaccines and concerns of potential future effects of vaccines. Similar to more serious forms of celebrity admiration, this finding suggests that people with a general interest in celebrities already know that vaccines are beneficial. However, the correlation between a general interest in celebrities and anti-vaccination attitudes indicates that people should be cautious of the influence celebrities may have on their attitudes toward vaccinations and other medical information. Additionally, we found that concerns about commercial profiteering correlated with beliefs in conspiracy theories, which is not surprising since both address similar ideas. For instance, people who are concerned about commercial profiteering would likely agree that 'vaccines make a lot of money, but not do much for regular people.' Likewise, people who believe in conspiracy theories would likely agree that 'the official versions of the events given by the authorities very often hide the truth.' This is consistent with previous findings on conspiracy theories and anti-vaccination attitudes (Jolley & Douglas, 2014; Roberts et al., 2005).

We also found that more serious forms of celebrity admiration positively correlated with belief in conspiracy theories. People who see their favorite celebrity as a form of entertainment like to discuss what their favorite celebrity has done, so they may be more likely to talk about their favorite celebrity's conspiracy belief and adopt the belief. Likewise, if a person is intensely attracted to their favorite celebrity, they may see their favorite celebrity's beliefs as attractive too.

Furthermore, celebrity admiration correlated with conspiracy theories, but a general interest in celebrities did not correlate with conspiracy theories. Similar to the lack of correlation between general interest in celebrities and anti-vaccination attitudes, general interest in celebrities may not be enough to be associated with people's beliefs in conspiracy theories. However, the correlation between celebrity admiration and conspiracy theories is still enough to warrant attention on the association of celebrities with public opinion.

Limitations and future research

This study was correlational in nature, so our results should be interpreted with caution. The design does not allow us to make causal conclusions about celebrity admiration and anti-vaccination attitudes; we are unable to conclude whether celebrity admiration causes

anti-vaccination attitudes or anti-vaccination attitudes lead to celebrity admiration. For example, people with anti-vaccination attitudes may seek representative others with similar attitudes to confirm and bolster their own beliefs. Therefore, it is possible that people with anti-vaccination attitudes turn to celebrities to validate their beliefs, and as a result they end up increasing their admiration for celebrities.

The possibility exists that anti-vaccination attitudes and celebrity admiration do not directly influence each other but may be related through a third unknown factor. For example, anti-vaccination attitudes have been strongly correlated with preferences for getting health information online (Martin & Petrie, 2017). People with preferences for getting health information online and who hold anti-vaccination attitudes may turn to celebrities for their information. Previous studies also suggest that people believe celebrities are more credible than medical experts (Caulfield & Fahy, 2016). Therefore, trust in physicians and medical experts (e.g., Huynh & Sweeny, 2014; Huynh et al., 2018) and other patient factors such as patient emotions (e.g., Legg et al., 2015) should be explored in relation to celebrity admiration and anti-vaccination attitudes. Future research should continue to explore the relationship between celebrity admiration and anti-vaccination attitudes to further understand predictors of anti-vaccination attitudes.

Conclusion

The results of this study suggest that celebrity admiration and anti-vaccination attitudes are directly associated. Moreover, people with more serious forms of celebrity admiration and a general interest in celebrities did not question the effectiveness of vaccines, as measured by the VAX subdomain of mistrust of vaccine benefits. Instead, they were primarily concerned about the potential side effects and commercial profiteering of vaccines. Our study suggests a new way of approaching people's anti-vaccination attitudes that may be used to effectively educate the public about the importance of vaccinations.

Disclosure statement

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