

# The Relationship Between Vaccine Experience and Vaccine Harm Belief

## BACKGROUND

Freeman, Garety, Kuipers, Fowler, & Bebbington (2002) proposed that beliefs form in one stage of a two-stage model and are maintained in a separate stage. Belief formation (stage 1) can be thought of as two steps: a) an event becomes an experience, and b) this experience becomes a belief. For example, a person hears a sound that has a mundane origin, but interprets it as a meaningful experience (e.g., a ghost). That experience could then become a belief in ghosts. This research is evaluating the belief formation stage for vaccine harm beliefs.

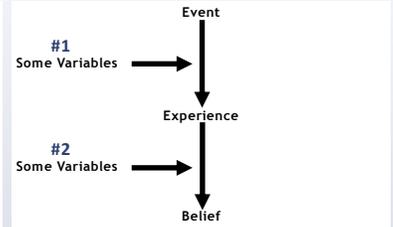
Question: What is the role of experience in belief formation?

1. What personality variables predict whether or not someone interprets an event as an experience? (Regression with experience as DV and personality as IVs.) #1
2. What personality variables mediate experience-belief relationships?
3. What are the properties of experiences that predict belief? (Regression with belief as DV and experience properties as IVs.) #3

The ultimate aim is to identify who is susceptible to forming beliefs based on various types of events and to identify the properties of an event most likely to lead to belief.

This study will also allow an evaluation of assumptions developed from paranormal belief research:

1. Belief arises from experience and reflects a rational response to experience.
2. Understanding the experiential foundations of belief will be complicated.
3. Understanding the experiential foundations of belief will be necessary to understand how to change consequential misbeliefs (e.g., vaccine harm beliefs).



## METHOD

### Participants

Participants were recruited from the MTSU research pool and via online postings to blogs and Facebook groups that have anti-vaxer content (N = 278). Participants completing less than 90% of the survey (N = 41) or reporting a lack of effort (N = 22) were removed. Average age = 23.1 (SD = 10.89; 18-67;  $M_{\text{female}} = 21.5$ ); 52 male, 155 female, 7 nonbinary; 112 had at least some college, 71 had a high school diploma or associates degree; 28 reported probably or above on a vaccine experience, 21 were unsure, 166 had not had a vaccine experience, 55 had a close other's vaccine experience, 61 had heard vaccine stories, and 90 had media experience.

### Measures

#### Experience

- Personal vaccine experience ["Have you personally witnessed or experienced a situation where a person had an adverse reaction close in time with receiving a vaccination (think of any type of harm including development of autism?"; number experienced and witnessed, properties, fear, quality].
- Close other's vaccine experience (experienced or witnessed, who, properties, their PANAS and credibility, your fear and quality, feels happened to you).
- Story vaccine experience (how often, properties, your fear and quality).
- Media vaccine experience (for social media, celebrities, YouTube, movies, blogs how often, level of knowledge, competence, intelligence, credibility, expertise).

#### Behavior

- Personal intent (derived from tables 2-4 in Larson, Jarrett, Schulz, Chaudhuri, Zhou, Dube, Schuster, MacDonald, Wilson, & the SAGE Working Group on Vaccine Hesitancy, 2015): Would you, personally, make the choice to receive a vaccine in the future? Would you, personally, make the choice to have someone in your care receive a vaccine in the future?

### Belief

- Vaccine hesitancy (modified from Appendix B of Larson et al., 2015): Vaccines are important for people's health; Vaccines are effective; Being vaccinated is important for the health of others in my community; All vaccines offered in my community are beneficial; New vaccines carry more risks than older vaccines; The information I receive about vaccines from the medical community is reliable and trustworthy; Getting vaccines is a good way to protect people from disease; Generally, I do what my doctor or health care provider recommends about vaccines; I am concerned about the serious adverse effects of vaccines; People do not need vaccines for diseases that are not common anymore.
- Harm concern: What is your overall level of concern about adverse effects from vaccines; Vaccines have been linked to autism; Vaccines have been linked to short term physical harm; Vaccines have been linked to long term physical harm.

### Personality

- Schizotypy (SPQ-B; Raine & Benishay, 1995): sensation seeking (SSS; Stephenson, Hoyle, Palmgreen, & Slater, 2003); private body consciousness (PBC; Miller, Murphy, & Buss, 1981); attitude towards science (ATS; Hartman, Dieckmann, Sprenger, Stastny, & DeMarree, 2017); conspiracist ideation (CI; Swami, Barron, Weis, Voracek, Steiger, & Furnham, 2017); empathy (BES; 3 subscales contagion (feel others' emotions), empathy, disconnect; Carré, Stefaniak, D'Ambrosio, Bensalah, & Besche-Richard, 2013); "Big 5" (with subscales of extraversion, agreeableness, openness, neuroticism, and conscientiousness; Donnellan, Oswald, Baird, & Lucas, 2006); paranoia (Freeman, Garety, Bebbington, Smith, Rollinson, Fowler, Kuipers, Ray, & Dunn, 2005); tolerance for ambiguity (Mac Donald, 1970); critical thinking (CT, with subscales of systematicity and analyticity, ingenuity and convergence, and maturity and skepticism; Yuan, Liao, Wang, & Chou, 2014); locus of control (Rotter, 1966); and absorption (Tellegen, & Atkinson, 1974).

#### Demographic Items

- Age, gender, education level.

## RESULTS

### What have they experienced?

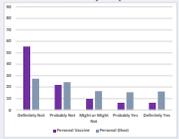


Figure 1. Personal vaccine experience (with ghost data for comparison).

Overall, experience was low.

Table 1. Frequency of experience-belief combinations.

|                            | Low Belief      | High Belief     |
|----------------------------|-----------------|-----------------|
| Lower personal experience  | 85 <sup>a</sup> | 80 <sup>b</sup> |
| Higher personal experience | 14 <sup>a</sup> | 35 <sup>b</sup> |

Note. Median split on harm concern, higher experience is defined as "might or might not" or above.

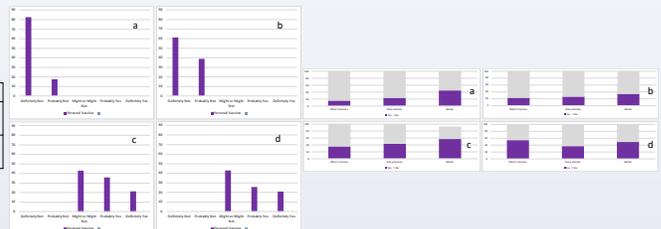


Table 2. Personality-experience correlations.

|                 | ATS | CI | Big 5 A | Par | CT S&A | CT M&S |
|-----------------|-----|----|---------|-----|--------|--------|
| Personal exper. |     |    |         |     |        |        |
| Close other's   |     |    |         |     |        |        |
| Story           |     |    |         |     |        |        |
| Media           | .21 |    |         |     |        |        |

Note. Only dependent variables with an internal reliability ( $\alpha$ ) > .7 are reported. Only significant correlations appear in the table (corrected  $\alpha$  = .003). ATS = attitude towards science, CI = conspiracist ideation, Big 5 A = agreeableness, Par = paranoia, CT = critical thinking, S&A = systematicity and analyticity, and M&S = maturity and skepticism. ATS higher is negative attitude.

Table 3. Experience-belief correlations.

|                   | Personal | Other's | Story | Media |
|-------------------|----------|---------|-------|-------|
| Vaccine hesitancy | -.23     |         |       |       |
| Harm concern      | .40      | .19     |       |       |
| Personal intent   |          |         |       |       |

Note. Only dependent variables with an internal reliability ( $\alpha$ ) > .7 are reported. Only significant correlations appear in the table (corrected  $\alpha$  = .012). Hesitancy higher is positive attitude, harm higher is negative attitude, intent higher is positive attitude.

### Personality-experience regressions

- DV = Personal experience, 15 predictors,  $F(15, 186) = 1.34, p = .18, R^2_{adjusted} = .02$ .
- Sensation seeking, agreeableness
- DV = Other's experience, 15 predictors,  $\chi^2(15) = 17.05, p = .32, R^2_{adjusted} = -.12, 75.2\%$  of cases correctly classified.
- Sensation seeking, paranoia
- DV = Story experience, 15 predictors,  $\chi^2(15) = 9.66, p = .84, R^2_{adjusted} = -.07, 72.3\%$  of cases correctly classified.
- DV = Media experience, 15 predictors,  $\chi^2(15) = 28.00, p = .02, R^2_{adjusted} = .17, 64.4\%$  of cases correctly classified.
- ATS, schizotypy, extraversion #1

Only the model for media experience was significant.

### Experience-belief personality mediation analysis

- Personal experience vaccine hesitancy: sensation seeking.
- Personal experience-harm concern: No significant mediators.
- Other's experience-vaccine hesitancy: N/A
- Other's experience-harm concern: No significant mediators.

### Experience properties-belief regressions

- DV = Vaccine hesitancy
  - Personal experience, 6 predictors,  $F(6, 69) = 1.06, p = .40, R^2_{adjusted} = -.004$ .
  - Other's experience, 9 predictors,  $F(9, 39) = 2.62, p = .02, R^2_{adjusted} = .23$ .
  - Competence
  - Story experience, 5 predictors,  $F(5, 52) = 1.89, p = .11, R^2_{adjusted} = .07$ .
- DV = Harm concern
  - Personal experience, 6 predictors,  $F(6, 69) = 2.05, p = .07, R^2_{adjusted} = .08$ .
  - Other's experience, 9 predictors,  $F(9, 39) = 4.77, p < .001, R^2_{adjusted} = .41$ .
  - Competence
  - Story experience, 5 predictors,  $F(5, 52) = 4.84, p = .001, R^2_{adjusted} = .25$ .
  - Quality

Note. The models for personal intent violated assumptions for regression, and media experience had low IVs in each type.

## DISCUSSION

- Personality did not provide much leverage on predicting who will have an experience, with only media experience being predicted. There was only one significant personality mediator for the three significant experience-belief relationships.
- The properties of the experience did predict for vaccine hesitancy belief (other's experience) and harm concern (other's and story experience).
- Overall, the participants had little experience with adverse vaccine reactions. This may be making it difficult to evaluate the experience part of the model. The assumptions relevant to the experiential foundations of belief are not supported.
- What does predict belief? The section labeled "Lagnippe" shows that personality was a significant predictor for belief for all three types of belief. Perhaps for a belief like vaccine harm, experience is not necessary. Rather, the right predispositions (negative attitude towards science, conspiracist ideation, and lower critical thinking) can lead to belief on their own. This suggests the need to evaluate additional consequential misbeliefs and to collect data from a sample of people who have experienced vaccine harm.

Table 4. Personality-belief correlations.

|                   | ATS  | CI   | Big 5 A | Par  | CT S&A | CT M&S |
|-------------------|------|------|---------|------|--------|--------|
| Vaccine hesitancy | .55  | -.40 |         |      |        |        |
| Harm concern      | -.50 | .29  |         |      |        |        |
| Personal intent   | .34  | -.28 | .26     | -.28 | -.29   | -.27   |

Note. Only dependent variables with an internal reliability ( $\alpha$ ) > .7 are reported. Only significant correlations appear in the table (corrected  $\alpha$  = .003). ATS = attitude towards science, CI = conspiracist ideation, Big 5 A = agreeableness, Par = paranoia, CT = critical thinking, S&A = systematicity and analyticity, and M&S = maturity and skepticism. Hesitancy higher is positive attitude, harm higher is negative attitude, intent higher is positive attitude, ATS higher is negative attitude.

### Personality-belief regressions

- DV = Vaccine hesitancy, 15 predictors,  $F(15, 181) = 10.82, p < .001, R^2_{adjusted} = .43$ .
- ATS, CI, agreeableness, CT S&A, CT M&S
- DV = Harm concern, 15 predictors,  $F(15, 185) = 6.54, p < .001, R^2_{adjusted} = .29$ .
- ATS, agreeableness
- DV = Personal intent, 15 predictors,  $F(15, 186) = 4.58, p < .001, R^2_{adjusted} = .21$ .
- ATS, sensation seeking, CI

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