

How the (anti)vaccine information credibility could be changed? The importance of personality traits, attitudes and expert source presence

Ivana Václavíková¹

Lenka Selecká²

Rudolf Fábry³

¹ Department of Psychology, Ss. Cyril and Methodius University; Nám. J.Herdu 2, 917 01 Trnava, Slovakia; ivana.vaclavikova@ucm.sk

² Department of Psychology, Ss. Cyril and Methodius University; Nám. J.Herdu 2, 917 01 Trnava, Slovakia; lenka.selecka@ucm.sk

³ Department of Psychology, Ss. Cyril and Methodius University; Nám. J.Herdu 2, 917 01 Trnava, Slovakia; rudolf.fabry@ucm.sk

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Abstract The aim of the research is to identify relevant personality traits measured by NEO-FFI (the Big Five model) and individual attitudes that influence the assessment of the information credibility. People's attitudes towards vaccination were examined (N = 234, M = 26.13y.), with items representing the cognitive, affective and conative component of the attitude. Research has an experimental design, the information about vaccination are given under two conditions: 1. by the anonymous source and 2, if the source of the information is attributed to an expert. A significant negative change in the credibility, considering the presence of the source is confirmed. The results provide evidence of the importance of attitudes in the possibility to influence the credibility of the information. Important personality traits connected with a negative attitude towards vaccination are higher neuroticism and agreeableness. Further, participants with positive vaccination attitude have lower tendency to be influenced by information with an expert source in the terms of trustworthiness decrease.

Key words vaccination; credibility of information; credibility of a source; Big Five; attitudes

1. INTRODUCTION

An increasing number of parents doubts or even refuses the vaccination and, recently, vaccine controversies became stronger across many countries. Despite an enormous success paediatricians are meeting increasing numbers of parents who refuse vaccination of their children (Trebičavský, 2016), usually due to given half-truth or even manipulative information provided by unreliable sources. Possibility to cumulate information from many sources in a few seconds leads to situations, where an individual is exposed to contradictory information given by different sources. Especially in the case of vaccination, a failure to follow right decision could lead to serious consequences - not only for an individual but even for the distinct population as a whole. This situation draws attention to the issue of credibility, the quality of the information itself and its resources. As Salmon et al. (2005) has reported, a significant number of parents feel that physicians do not provide enough information and that public health officials are not trustworthy. As

the source of health information can have a significant impact on the acceptance of information and the degree to which it is trusted and on which it is acted, it seems to be crucial to devote research attention to the credibility assessment process.

Credibility is a multifaceted concept encompassing two fundamental dimensions: expert knowledge/expertise and trustworthiness. Expertise as perceived knowledge, skills and experience of the source (Fogg et al., 2003) is closely related to the resource's ability to provide a valid information perceived by the recipient and it is particularly significant in supporting an existing attitude (Tormala, Petty, 2004). When an individual perceives the information resource as being an expert, he/she has a higher tendency to evaluate the information as trustworthy, which is a key factor in assessing credibility (Hilligos, Rieh, 2008). At least, it should be possibly like that, but recently in the case of vaccination, we are witnesses of a different process. Despite above mentioned, an increasing amount of parents places trust in non-traditional sources of safety information, such as celebrities, and in parents who believe that their child was harmed by a vaccine. Usually, these sources use anecdotal information or personal accounts rather than population-based data or clinical studies (Salmon et al., 2005; Freed et al., 2011).

Further, a tendency to rely on particular information and its credibility could be more radically affected by personality traits and attitudes of the individual, as in the media landscape people, not having enough capacity for a variety of information, are using cognitive heuristics (Metzger et al., 2010; Metzger, Flanagin, 2013) as substitution of the knowledge. These processes are influenced by individual's attitudes particularly in the affective component - it is difficult to change the affective component of attitude than cognitive because the behaviour of affectivity is far more important than objective knowledge (Ruisel, 2004).

The research field devoted to the assessing of the credibility of information based on its source is covered by many studies (e.g. Avery, 2010; Eysenbach, 2008; Kim, Lee, Prideaux, 2013; Marshall, WoonBong, 2003; Metzger, Flanagin, 2013; Morin et al., 2012), the impact of the information and the source of the information on the change in the attitude toward topic is taken into consideration too (Tormala, Petty, 2004; Tormala, Briñol, Petty, 2006). However, the

personal characteristics of the recipient in relation to the level of credibility attributed to the information regarding the source and their own attitudes are not well investigated yet - for that reason it seems to be important to focus the research on the area emphasising psychological perspectives.

The aim of this paper is to verify the possibility of influencing the credibility assessment of the information regarding the (non-)presence of an expert source, to identify the personality traits of the recipient, relevant to the change in the assessment of the credibility of the information and analyse the relationship between personality traits of the recipient, his attitude, and the influence of the presence of a source of information on the credibility assessment process.

2. METHOD

2.1 Research Sample

Research sample consists of 234 people with mean age of 26.13 years ($SD=7.718$). Participants have enrolled the research on a voluntary basis. Before the data collection, they were informed on the area of research and continued after their oral consent.

2.2 Methods

The exploratory-confirmatory research has been executed in the form of a within-subject experimental plan with a quantitative design. Stimuli are composed of four parts: 1. focused on assessing the credibility of information without the source, 2. focused on assessing the attitudes of recipients in specific areas, 3. assessing the personality traits of the recipient, and 4. assessing the credibility of information with expert sources.

1. Author's questionnaire is focused on the topic of how much credibility is given to the information by the participant. The information is presented through 4 hypothetical claims with the relation to the area of vaccination. Two information support the opinion and two information controvert the opinion.
2. The questionnaire is focused on the assessment the participants' attitudes towards vaccination. It is represented by three statements in compliance with the three components of an attitude (conative, cognitive and affective).
3. Personality Inventory NEO-FFI (Costa, McCrae, Slovak adapt. by Ruisel, Halama, 2007) contains following dimensions: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness.
4. Author's questionnaire contains statements oriented on the same information as in the first part, but, on contrary from the first questionnaire, an expert source of the information is enclosed.

The information administration without a source and subsequent information administration with an expert source aims to compare credibility assessment of the information in different experimental conditions.

3. RESULTS

After administration of information, containing an expert source, through a paired t-test following change has been identified, trust in vaccination is reduced ($t=2.169$; $df=233$; $p=0.031$).

In order to identify factors that could affect the change of the credibility of information about vaccination in the experimental

condition (the administration of information containing an expert source), we have executed multiple regression analysis. The dependent variable reflects a possible decrease or an increase of credibility in vaccination.

A decrease in the credibility of vaccination after the exposure of an expert source is recognised. The decrease is predicted by the conative component of attitude, the effective component of attitude towards vaccination and age (Table 1). Namely, a more positive conative component in attitude predicts a reduction in the credibility of the information, while a more affective component leads to a smaller reduction in the credibility, lastly, higher age of the participants leads to a significant reduction in the credibility of the information. Personality traits haven't manifested as important towards vaccine information credibility.

Table 1: Decrease in credibility in vaccination after the administration of information with an expert source (multiple regression analysis)

	B	SE	β	t	Sig.	VIF
Conative component of the attitude	0.715	0.166	0.396	4.299	0.000	2.142
Affective component of the attitude	-0.365	0.160	-0.211	-2.285	0.023	2.157
Age	0.030	0.014	0.140	2.209	0.028	1.014

$R^2 = 0,095$, $Adj.R^2 = 0,083$, $DW = 2,038$

As the attitude towards vaccination, respectively the components of the attitude manifested as important in relation to the vaccine information credibility change, we have tested the potential relationship between attitude towards vaccination and personality traits of participants. A weak negative relationship has appeared between individual attitude towards vaccination and neuroticism ($r=-0.211$; $p=0.001$).

Based on results, the attitude towards vaccination seems to be significant for the credibility change. Due to this result, we decided to compare groups of participants created along the attitude polarity. It has been shown that participants characterised by extremely negative attitude compared to participants with an extremely positive attitude differ in specific personality traits and in the level of credibility assessment (Table 2). Particularly, a group of participants with a negative attitude is characteristic of a higher level of neuroticism and lower level of agreeableness, this group proved to be as well more influenceable in terms of credibility decrease in the information administered with an expert source. Contrariwise, participants who have a positive attitude, trust the information about vaccination more compared to the participants with a negative attitude in both experimental conditions (information without and with source). In relation to this, results indicate the change in credibility (decrease) is created in the group of participants with an extremely negative attitude (see Table 3 for more detailed view).

Table 2: Comparison of participants with extreme attitudes towards vaccination (negative and positive attitude) in personality traits and vaccine information credibility (Mann-Whitney U test)

	Attitude polarity	N	MR	Me	U	Sig.
Neuroticism	Negative	64	77.81	22.50	1516.00	0.002
	Positive	69	56.97	18.00		
Agreeableness	Negative	64	58.86	30.00	1687.00	0.019
	Positive	69	74.55	32.00		
Credibility without an expert source	Negative	64	34.18	9.00	107.50	0.000
	Positive	69	97.44	14.00		
Credibility with an expert source	Negative	64	33.84	9.00	85.50	0.000
	Positive	69	97.76	14.00		
Change in credibility	Negative	64	57.52	-0.50	1601.00	0.005
	Positive	69	75.80	0.00		

For further investigation of the importance of the attitude towards vaccine information in the potential to influence the credibility assessment of the information, we have investigated if credibility changes in extreme polarities of attitude (Table 3). As for the change we have confirmed that participants with negative attitude towards vaccination are suggestible to an expert source in terms of decrease of the credibility. While participants with a positive attitude don't change significantly their trust in vaccination after the presentation of an expert source.

Table 3: Identified changes in credibility level after the expert source presented with regards to extreme attitudes (Wilcoxon signed-rank test)

Attitude	Credibility		N	MR	Z	Sig.
Negative	With a source Without a source	Negative ranks	14	18.82	-3.093b	0.002
		Positive ranks	32	25.55		
		Ties	18			
Positive	With a source Without a source	Negative ranks	22	17.34	-0.473c	0.636
		Positive ranks	15	21.43		
		Ties	32			

b based on negative ranks, c based on positive ranks

Aiming to identify factors that have the potential to predict attitude type towards vaccination (positive attitude, neutral attitude, and negative attitude) we have executed multinomial logistic regression analysis (Table 4). The reference category in the analysis is the negative attitude. Predictors manifested as significant are personality traits - neuroticism and openness to experience, and credibility assessment with an expert source when considering negative versus positive attitude. Credibility assessment without an expert source is an important predictor towards the membership to negative attitude considering both neutral and positive attitude. Participants with a higher level of neuroticism and openness to experience, and lower trust in the information (with or without an expert source) are predicted to belong to the negative attitude type towards vaccination.

Table 4: Prediction of membership on the levels of attitudes towards vaccination (multinomial logistic regression analysis)

1 vs 2	B (SE)	Sig	Lower	Exp B	Upper
Credibility without a source	0.894 (0.177)	0.000	1.729	2.445	3.457
1 vs 3	B (SE)	Sig	Lower	Exp B	Upper
Neuroticism	-0.087 (0.041)	0.034	0.846	0.917	0.993
Openness to experience	-0.101 (0.051)	0.047	0.818	0.904	0.999
Credibility without a source	1.014 (0.256)	0.000	1.668	2.756	4.553
Credibility with a source	1.048 (0.288)	0.000	1.621	2.851	5.013

4. DISCUSSION

As we mentioned in the introduction part, there is an increasing number of parents who refuse vaccination of their children (Trebichavský, 2016). In the context of this process and the severity of the issue of vaccination, the decline in the credibility of the information in the presence of a source appears to be a really important result. It suggests that in the area of health people have a stronger tendency to consider public health officials as less trustworthy (Salmon et al., 2005). Probably a double standard in considering this issue is applied, people tend to reject the message of the importance of vaccination, which is mediated by a formal authority (Masaryk, Čunderlíková, 2016) and they use anecdotal information or personal accounts rather than population-based data or large clinical studies (Salmon et al., 2005; Freed et al., 2011). Further, as Salmon et al. (2005) stated, the most common reason for refusing vaccination is concern that it might cause harm. Indeed, parents of exempt children in mentioned research were significantly

more likely than parents of vaccinated children to report low perceived vaccine safety and efficacy, a low level of trust in the government, and low perceived susceptibility to and severity of vaccine-preventable diseases. Parents of exempt children were significantly less likely to report confidence in medical, public health, and government sources for vaccine information and were more likely to report confidence in alternative medicine professionals than parents of vaccinated children.

Our findings might contribute to a more specific understanding of this process regarding the personality and attitudinal context. Results indicate that the decrease in credibility is based on the change in the group of participants with an extremely negative attitude. And, the group of participants with a negative attitude is characteristic of a higher level of neuroticism and lower level of agreeableness, this group proved to be as well more influenceable in terms of credibility decrease in the information administered with an expert source. The finding suggests the more a person is neurotic the more likely he/she tends to be influenced by the possible messages about the harmfulness of vaccination. Thus, an explanation can be offered by an experimental finding of a potential failure of a highly credible source in the case that the report causes uncomfortable feelings (Tormala, Briñol, Petty, 2006), especially among more neurotic persons. Further, stronger attitudes are much easier influenced in the same direction; they are changing in a congruent way, ergo, getting even more extreme.

Still, we have to consider that the decrease of credibility is predicted mainly by a conative component of the attitude, affective component of the attitude, and age. More specifically, conative component and age cause the highest level of the identified credibility decrease – affective component predicts significant lower proportion of the change. Among the participants, the willingness to get vaccinated or to let vaccinate their child seems not to be connected with the assessment of the information as credible, especially when it is given by an expert source. Similar results have been identified for age as a predictor. These relationships definitely call for further research, but we can formulate several hypothetical explanations. Firstly, although participants are willing to get vaccinated (and, according to law, they mostly are), their behaviour could be rather explained by simple obligations fulfilment. Thus, in the process when information given by formal authority is assessed, an individual could be losing his/her trust in the importance of vaccination. Secondly, above mentioned process could be enhanced by raising age and experiences, which show formal authorities as untrustworthy. And, last, but not least, affective component seems to play a key role in the credibility decrease. Positive affect in attitude is significant for credibility assessment (Ruisel, 2004) but, at the same time, it leads to lower credibility decrease. Thus, we can hypothesise (carefully) the positive attitude component as having the potential to be a protective factor for sustaining the importance of vaccination. As we know, participants who have a positive attitude, trust the information about vaccination more compared to the participants with a negative attitude in both experimental conditions (information without and with source). Another positive aspect remains, vaccination is connected to a prevalently positive attitude; and this attitude is further associated with lower levels of neuroticism, respectively with emotional stability. Although most parents place a lot of trust in formal authorities (Salmon et al., 2005; Freed et al., 2011), parents' trust in non-health professional sources for such information should not be discounted. And, as states Trebichavský (2016), it is important to convince parents in a sensible way and without confrontation. Leading experts have to discuss with antivaccinists and use hard facts.

Sources

1. Avery, E. J. (2010). The role of source and the factors audiences rely on in evaluating credibility of health information. *Public Relations Review*, 36 (1), 81-83.
2. Eysenbach, G. (2008). Credibility of health information and digital media: new perspective and implications for youth. *Digital Media, Youth, and Credibility*, Cambridge: MA, 123-154.
3. Fogg, B. J. et al. (2003). How do users evaluate the credibility of Web sites? Proceedings of the 2003 conference on designing for user experiences (DUX'03).
4. Freed, G.L, Clark, S.J., Butchart, A.T., Singer, D.C., & Davis, M.M. (2011). Sources and Perceived Credibility of Vaccine-Safety Information for Parents. *Pediatrics*, 127(1). 107-112.
5. Freeman, K.S., & Spyridakis, J.H. (2004). An examination of factors that affect the credibility of online health information. *Technical Communication*, 51(2), 239-263.
6. Hilligoss, B., & Rieh, S.Y. (2008). Developing a unifying framework of credibility assessment: Construct, heuristics, and interaction in context. *Information Processing and Management*, 44, 1467-1484.
7. Kim, S. S., Lee, J. & Prideaux, B. (2013). Effect of celebrity endorsement on tourists' perception of corporate image, corporate credibility and corporate loyalty. *International Journal of Hospitality Management*, 37, 131-145.
8. Marshall, R. & Woonbong, N. (2003). An experimental study of the role of brandstrength in the relationship between the medium of communication and perceived credibility of the message. *Journal of Interactive Marketing*, 17, 3, 75-79.
9. Masaryk, R. & Čunderlíková, A. (2016). Argumenty oponentov vakcinácie: príbeh nedôvery. Sborník abstrakt sdělení. Ostrava: Pedagogická fakulta OU v Ostravě.
10. Metzger, M. J., Flanagin, A. J. & Medders, R. B. (2010). Social and Heuristic Approaches to Credibility Evaluation Online. *Journal of Communication*, 60 (3), 413-439.
11. Metzger, M. J. & Flanagin, A. J. (2013). Credibility and trust of information in online environments: Theuse of cognitive heuristics. *Journal of Pragmatics*, 59 (B), 210-220.
12. Morin, D. T., Ivory, J. D. & Tubbs, M. (2012). Celebrity and politics: Effects of endorser credibility and sex on voter attitudes, perceptions, and behaviors. *The Social Science Journal*, 49, 4, 413-420.
13. Ruisel, I. 2004. Inteligencia a myslenie: Riešenie závažných problémov ľudstva v 3. tisícročí závisí od schopnosti využiť našu prirodzenú inteligenciu. Bratislava: Ikar.
14. Ruisel, I. & Halama, P. (2007). NEO päťfaktorový osobnostný inventár. Praha: Testcentrum, Hogrefe.
15. Salmon, D.A., et al. (2005). Factors Associated With Refusal of Childhood Vaccines Among Parents of School-aged Children: A Case-Control Study. *Arch Pediatr Adolesc Med*. 2005;159(5):470-476.
16. Tormala, Z. L. & Petty, R. E. (2004). Source Credibility and Attitude Certainty: A Metacognitive Analysis of Resistance to Persuasion. *Journal of Consumer Psychology*, 14 (4), 427-442.
17. Tormala, Z.L., Briñol, P. & Petty, R.E. (2006). When credibility attacks: The reverse impact of source credibility on persuasion. *Journal of Experimental Social Psychology*, 42, 684-691.
18. Trebichavský, I. (2016). Odpůrci očkování. *Pediatric pro praxi*; 17(1): 13-15.
19. Vernancová, J. (2005). Sociálna a pedagogická psychológia. Nitra: Slovenská poľnohospodárska univerzita v Nitre.