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Committed pro- and anti-vaccine groups: how they view each other's competence, warmth, and level of identity

Abstract: This paper investigates how active opponents and supporters of vaccination (meeting the criteria of group members) perceive each other in the context of the dimensions of competence and warmth, and how they perceive each other's group identity. The study was conducted online, the final research sample included 192 committed pro-vaccine and 156 committed anti-vaccine group members. Both groups assigned an average level of competence to the other group, while they rated the outgroup's warmth as below average. These results may be associated with the conflicting attitudes of these groups. It also turned out that both groups evaluated each other's identities above the theoretical average. Results are discussed in context of the concept of in-group bias and the heterogeneity of motivations causing vaccine rejection.

Keywords: *competence, warmth, social perception, anti-vaccine group, pro-vaccine group*

INTRODUCTION

Anti-vaccinationists and pro-vaccinationists as social groups

Past research on social groups (especially the 1950s) focused on interpersonal behavior in small groups (Mansstead & Hewstone, 1996). Currently, it is recognized that the key processes for group formation are identification with the group and commitment to group function. Group identity is seen from the cognitive-motivational perspective and the perspective of intergroup relations. Another important object of interest for researchers of group processes is the issue of perceptions of other social groups and relations between them, where the dimensions of agency and communion (competence and warmth) play a key role (Phate & Poppe, 1997). We decided to take a closer look at how the two groups of vaccine supporters and vaccine rejecters perceive each other, i.e., what vaccine supporters think of vaccine rejecters and vice versa.

The main aim of our research was to compare how these two seemingly antagonistic groups perceive each other – how they see the other group's competence,

warmth, and group identity. Our main research questions were: How are outgroup members perceived with respect to the dimensions of warmth and competence? How the opponents and supporters of vaccination perceive the outgroup's level of identity? What is the relation between outgroup identity judgments and the perceptions of the competence and warmth of outgroups? What is the level of identity of supporters and opponents of vaccination with their respective groups? In sum – we wanted to learn how two opposing groups view each other during the unique time of the pandemic.

Perceptions of outgroup members in the competence and warmth dimensions

Agency and communion are two basic dimensions of social perception. Agency refers to the efficiency, competence, effectiveness in achieving goals. Communion refers to functioning in social relationships and has two sub-dimensions: warmth (being kind, cordial, considerate) and morality (being honest, adhering to moral norms). Agency and communion play a key role in the perception of oneself, other people, and relationships between



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individuals. These two fundamental dimensions have also been found to be important in the perception of social groups and relationships between them (Phalet & Poppe, 1997; Cuddy, Fiske & Glick, 2007, 2008, 2009). Fiske, Xu, Cuddy, and Glick (1999) (who refer to agency and communion as competence and warmth, respectively) developed what is known as the Stereotype Content Model. This model assumes that competence and warmth are the primary dimensions of the content of all stereotypes of groups - regarding gender, nationality, age, ethnicity, occupation, and other group divisions. We assume that this is also true for groups that radically differ in their attitudes toward vaccination. Research by the creators of this model indicates that competence and warmth are two independent (separate) dimensions of the stereotype content of distinguished groups. Ratings within these dimensions can be positive or negative. This means that the stereotype of a group can be uniformly positive, uniformly negative, or ambivalent. Ambivalent stereotyping occurs when groups are perceived as: a) competent but unfriendly or even hostile with bad intentions or: b) warm, communal, but lacking competence. Research shows that most stereotypes turn out to be heterogeneous - as many as 80% of stereotyped groups are attributed more agency than communion, or vice versa.

Group identity: outgroup and ingroup perception

An important topic in research on processes which transform a set of individuals into a group (in the psychological sense) is social identity. We assume that group identity may develop for groups most members of which do not have direct contact with each other in the real world. This is consistent with the approach of Roccas, Sagie, Schwartz and Halevy (2008). In this case, "identification is largely symbolic rather than based on interpersonal relationships" (Roccas et al., 2008, p. 281). They propose four conceptually distinct modes of identification: **Importance** - to what extent I consider belonging to a group an important part of who I am; this aspect of identification means defining oneself through belonging to a group. **Commitment** - the extent to which one wants to act for the benefit of the group; this aspect of identification means strong positive feelings for the group. **Superiority** - believing that one's own group is more valuable than other comparable groups. **Deference** - believing in the need to comply with the rules of the group and its leaders and rejecting any criticism of the group.

From the social-psychological point of view, vaccine rejecters and vaccine supporters can be described as social groups which center around a shared opinion, rather than more tangible characteristics such as gender, nationality or affiliations to a social class. (Attwell & Smith, 2017). The opinion-based groups often form around controversial issues while oppositely defined opinion groups tend to advocate contrary viewpoints on these issues. The social identity of both opposite groups is then defined by the shared in-group beliefs (Blüch, McCarthy, Reynolds & Muntele, 2007). Anti-vaccinationists can build their social identity on the belief that they possess unique, hard-

earned knowledge about the true nature of vaccines - knowledge that is unavailable to much of the public, who are 'misled by pharmaceutical companies and their bribed physicians'. As Motta, Callaghan and Sylvester (2018) noted, this overconfidence is linked to opposition to the policy of mandatory vaccination. Vaccine supporters, on the other hand, base their identity on majoritarian common sense, concern for the common good (i.e., health) and respect for scientific authorities. As Attwell and Smith (2017) claim, both anti - and pro - vaccine individuals identify themselves as 'the wise', and conflicts which emerge between these groups may strengthen the identities of both.

The above-mentioned position - that opponents of vaccination can build group identity on the belief that they have unique knowledge - is consistent with Hogg's model, according to which the removal of subjective uncertainty is one of the most important motives in processes related to social identity (even stronger than the motive of self-valorization) (Hogg, 2000).

Current research

So far, there has been no systematic research on the issue of perceptions of the other group by supporters and opponents of vaccination (how these two seemingly antagonistic groups perceive each other). The current work is an attempt to fill this gap. The subject of our research is the perception of the outgroup on the dimensions of competence and warmth, and how the opponents and supporters of vaccination perceive the outgroup's level of identity. We also wanted to see if there would be a correlation between perceptions of outgroup identity and ratings of this group in terms of warmth and competence. We were also interested in the respondents' level of identification with their own group.

Well-intentioned people are perceived as "warm", so it can be expected that in situations of apparent conflicts of values and attitudes (which is clearly the case with supporters and opponents of vaccination), the evaluation of the external group will be more negative in the dimension of warmth, rather than competence.

METHOD

The study was conducted online in the second half of 2020 by the Ariadna Nationwide Research Panel, a company specialized in polling large representative samples. The goal was to survey strongly pro-vaccine or anti-vaccine individuals, who moreover actively participate in various forms of discussion about vaccines. Such active contact with other similar-minded people would make them members of a group, allowing for measuring group identities. The study was not preregistered. The data that support the findings of this study are openly available in OSF repository: <https://osf.io/ywuc9/>

Participants

The targeted sample was found by applying selection criteria to 11 579 members of the Polish general population (the number of targeted people was so large

because finding those who met our criteria was very difficult). The selection criteria (1. being pro-vaccine or anti-vaccine and 2. being active in discussion about vaccines) were based on four questions: For attitudes toward vaccination, we asked (a) *What is your opinion about vaccination* (possible answers: *You should vaccinate*; *You should not vaccinate*; and *I am not sure/I don't care*); and (b) *Would you get vaccinated if there were a vaccine available for a new dangerous disease?* (answers ranging from 0 – *Definitely not* to 10 – *Definitely yes*). Participants who answered (a) *You should vaccinate* and (b) at least 7 on a scale of 0-10, were considered pro-vaccine. Participants who answered (a) *You should not vaccinate* and (b) no more than 3 on a scale of 0-10, were considered anti-vaccine. All others were dropped from the study. For being active in discussion, we asked (c) *Do you take active part in the discussion about the need to vaccinate or the consequences of vaccination?* (yes or no), which was followed by (d) a list of various types of active discussion contexts, from which the participants could select multiple responses: Internet forums, social media, conferences, pro-vaccine/anti-vaccine societies, discussion with acquaintances and other. Participants who indicated that they took part in discussions in any of these ways were included in the sample, and all other participants were omitted. Due to difficulties in finding individuals who met the selection criteria, the final sample size was $N = 350$ (203 women and 147 men), aged 18-76 years ($M = 41.63$, $SD = 14.56$). 27.4% of the participants lived in rural areas, 35.8% lived in towns of between 20 and 100 thousand inhabitants, and the remaining 36.9% lived in cities larger than 100 thousand inhabitants. Moreover, 9.1% had primary or vocational education, 31.4% had secondary education, 16% had postsecondary education, 10.6% had a bachelor's degree, and 32.9% had a master's degree.

Materials and procedure

The questionnaire consisted of four main parts. Part one collected demographic data (age, sex, education, residence) and responses to the above-mentioned selection questions. Respondents also answered the question "How involved are you in discussions on vaccination" (on a scale of 0-10 from *Not at all involved* to *Very involved*). Part two measured group identity using Roccas' questionnaire (Roccas et al., 2008) – measuring Importance, Commitment, Superiority and Deference of the participants' own group (pro-vaccine or anti-vaccine, respectively). The Cronbach's alpha reliability score was .92.

Part three employed a modified version of Roccas' questionnaire, which instead of measuring one's own group identity, asked about the *perceived identity of the other group*, i.e., asked pro-vaccine individuals about the perceived identity of the anti-vaccine group, and vice versa. This questionnaire also measured Importance, Commitment, Superiority and Deference with respect to the other group. For instance, while the standard Roccas' questionnaire used the statement *I feel strongly affiliated with this [the pro-vaccine] group*, our modified version measured attitudes toward the statement *Anti-vaccine in-*

dividuals feel strongly affiliated with their group. The Cronbach's alpha reliability score was .96.

Part four measured perceptions of outgroup competence and warmth. Respondents were asked to evaluate the outgroup's competence using 5 items representing the competence dimension (competent, confident, capable, efficient, intelligent; Fiske et al., 2002) on a scale from 1 (*[they] are not like that at all*) to 5 (*[they] are definitely like that*). To evaluate the warmth of the outgroup, the respondents were asked to rate 5 items representing the warmth dimension (trustworthy, warm, sincere, good-natured, friendly; Fiske et al., 2002) using the same scale as that used for the competence dimension. The Cronbach's alpha reliability score was .87 for the competence scale and .94 for the warmth scale.

RESULTS

We begin the presentation of the results by comparing the two groups (the pro-vaccine group and the anti-vaccine group) in terms of their declarations about involvement in discussions about vaccination. We then show results about whether there was a relationship between the perception of the identity of an outgroup and the attribution of competence and warmth to that group. The third part of the results demonstrates comparisons of perceptions of outgroup members in the identity as well as competence and warmth dimensions.

The two groups did differ significantly in their declared level of involvement in the discussion – the pro-vaccine group reported higher involvement ($M = 8.17$, $SD = 1.36$ vs. $M = 6.91$, $SD = 1.91$; $t(273,741) = 6.94$, $p < .001$). The declared level of involvement significantly positively correlated with all aspects of group identity as well as with all aspects of the perceived identity of the other group. We used Kendall's tau-b correlation coefficients due to violations of normality in the data; however, Pearson correlations indicated the same effects. Correlations are presented in Table 1.

Results indicate that in both groups, group identity positively correlates with involvement in discussions about vaccination – this applies to all four dimensions of identity.

We tested whether there would be a correlation between perceived outgroup identity and ratings of this group in terms of warmth and competence. All aspects of perceived outgroup identity positively correlated with perceived outgroup competence (Importance $\tau = .24$, $p < .001$, Commitment $\tau = .25$, $p < .001$, Superiority $\tau = .17$, $p < .001$, Deference $\tau = .21$, $p < .001$) and warmth (Importance $\tau = .17$, $p < .001$, Commitment $\tau = .19$, $p < .001$, Superiority $\tau = .08$, $p = .043$, Deference $\tau = .14$, $p < .001$). Thus, based on correlation analysis, it turned out that the higher the level of perceived identity of an outgroup, the higher the level of attributed competence and warmth to this group. So, there is a link between the research question of how the two groups perceive each other in terms of competence and warmth and the research questions of how group identity is perceived.

Table 1. Correlations between involvement and identity aspects.

Group	Involvement correlation with	Importance	Commitment	Superiority	Deference	Total
Pro-vaccine	Own identity	.44**	.45**	.45**	.42**	.45**
	Perceived outgroup identity	.23**	.23**	.19**	.19**	.21**
Anti-vaccine	Own identity	.28**	.40**	.31**	.33**	.35**
	Perceived outgroup identity	.15*	.16**	.22**	.18**	.17**
Entire sample	Own identity	.44**	.45**	.45**	.42**	.45**
	Perceived outgroup identity	.23**	.23**	.19**	.19**	.21**

Perceptions of outgroup members in the competence and warmth dimensions.

We compared how the two groups perceived outgroup competence and warmth. The

pro-vaccine group perceived the anti-vaccine group as having more competence than warmth ($M = 3.06$, $SD = 0.98$ vs. $M = 2.80$, $SD = 1.13$, $t(192) = 6.42$, $p < .001$, Cohen's $d = 0.93$), and the same was true for how the anti-vaccine group perceived the pro-vaccine group (competence $M = 3.11$, $SD = 0.85$, warmth $M = 2.77$, $SD = 1.07$, $t(156) = 6.76$, $p < .001$, Cohen's $d = 1.08$).

Since competence and warmth were measured on a scale of 1 to 5, where 1 = lowest competence/warmth, 5 = highest competence/warmth, and 3 indicates neither positive nor negative competence/warmth, we compared these qualities to this theoretical average to ascertain whether the outgroup's competence and warmth could be considered positive or negative. The results showed that the pro-vaccine group considered the anti-vaccine group to have average competence ($t(192) = 0.893$, $p = .373$, Cohen's $d = 0.12$) and below-average warmth ($t(192) = -2.412$, $p = .014$, Cohen's $d = 0.35$), and the anti-vaccine group evaluated the pro-vaccine group in a similar way as having average competence ($t(156) = 1.65$, $p = .101$, Cohen's $d = 0.26$) and below-average warmth ($t(156) = -2.75$, $p = .007$, Cohen's $d = 0.44$).

Perceived outgroup identity

We compared the perceived group identities (the pro-vaccine group's identity as perceived by the anti-vaccine group and the anti-vaccine group's identity as perceived by the pro-vaccine group) using MANOVA. There were no significant differences in how these two groups perceived each other's identities. The results are presented in Table 2.

We then ran a series of one-sample t-tests against the theoretical average value of 4, which corresponded to the 'Neither agree, nor disagree' answer to perceived outgroup identity aspects – results above this value would indicate that outgroup is perceived as a group with above-average (stronger) identity, and vice versa. It turned out that the pro-vaccine group perceived the anti-vaccine group's identity as above average ($t(192) = 9.113$, $p < .001$) and the same was true for the anti-vaccine group's perception of the pro-vaccine group ($t(156) = 9.291$, $p < .001$). Moreover, all outgroup identity aspects (Importance, Commitment, Superiority and Deference) were perceived as above average by both groups, all with $p < .001$. We compared the group identities of the pro-vaccine and anti-vaccine groups using MANOVA. The pro-vaccine group had a stronger identity than the anti-vaccine group in all respects. $F(1,348) = 29.45$; $p < .001$.

Own group identity and perceived outgroup identity

We also compared perceived outgroup identity aspects with own group identity aspects in the pro-vaccine and anti-vaccine groups. In the pro-vaccine group, all own group identity aspects were rated higher than perceived outgroup identity aspects. In the anti-vaccine group, however, there were no significant differences for Importance and Commitment, while Superiority and Deference were rated lower for the members' own group than for the pro-vaccine group. The results are presented in Table 3.

There were also significant positive correlations between own group identity and perceived outgroup identity in both groups. The correlation matrices are presented in Table 4.

Table 2. Perceived group identities of the pro-vaccine and anti-vaccine groups.

Identity	Anti-vaccine perceived by pro-vaccine	Pro-vaccine perceived by anti-vaccine	$F(1,348)$	P
Importance	$M = 4.85$, $SD = 1.38$	$M = 4.80$, $SD = 1.26$	.134	.714
Commitment	$M = 4.88$, $SD = 1.34$	$M = 4.79$, $SD = 1.22$	.487	.486
Superiority	$M = 4.91$, $SD = 1.47$	$M = 5.00$, $SD = 1.35$	.324	.570
Deference	$M = 4.85$, $SD = 1.44$	$M = 4.93$, $SD = 1.26$	.345	.557
Total	$M = 4.88$, $SD = 1.33$	$M = 4.88$, $SD = 1.19$	.002	.965

Table 3. Own identity vs. perceived outgroup identity.

Group	Comparison	Mean	Std. Deviation	T	p	Cohen's d
Pro-vaccine	Importance	5,40	1,11	4.89	<.001	.71
	Other-Importance	4,85	1,38			
	Commitment	5,51	1,09	5.76	<.001	.72
	Other-Commitment	4,88	1,34			
	Superiority	5,23	1,19	2.61	.01	.29
	Other-Superiority	4,91	1,47			
	Deference	5,19	1,16	2.87	.005	.29
	Other-Deference	4,85	1,44			
	Total	5,33	1,06	4.24	<.001	.58
	Other-Total	4,88	1,33			
Anti-vaccine	Importance	4,64	1,35	-1.27	.208	.15
	Other-Importance	4,80	1,26			
	Commitment	4,74	1,27	-.43	.669	<.01
	Other-Commitment	4,79	1,22			
	Superiority	4,70	1,29	-2.49	.014	.29
	Other-Superiority	5,00	1,35			
	Deference	4,61	1,34	-2.56	.011	.29
	Other-Deference	4,93	1,26			
	Total	4,67	1,22	-1.86	.065	.14
	Other-Total	4,88	1,19			

Table 4. Correlations between own group identity and perceived outgroup identity.

Group		Outgroup Importance	Outgroup Commitment	Outgroup Superiority	Outgroup Deference	Outgroup Total
Pro-vaccine	Importance	.244**	.213**	.167**	.209**	.211*
	Commitment	.238**	.228**	.172**	.219**	.221**
	Superiority	.192**	.182**	.166**	.200**	.185**
	Deference	.176**	.162**	.127*	.177**	.159**
	Total	.216**	.202**	.155**	.207**	.198**
Anti-vaccine	Importance	.247**	.198**	.229**	.229**	.220**
	Commitment	.228**	.191**	.269**	.277**	.241**
	Superiority	.247**	.230**	.247**	.276**	.249**
	Deference	.176**	.160**	.186**	.236**	.184**
	Total	.232**	.208**	.245**	.278**	.241**

Note: ** indicates correlations significant at $p < .005$, and * indicates correlations significant at $p < .05$

DISCUSSION

The objective of our research was to learn how involved vaccination supporters and opponents perceive the other group on the dimensions of agency (competence) and communion (warmth), and how they assess the outgroup's level of identity. Additionally, we examined participants' level of identification with their own groups. We found that some patterns of results are similar for both groups, but there are also interesting differences.

As regards the perceptions of outgroup competence and warmth, results of our research showed no differences between the anti-vaccine and pro-vaccine individuals in terms of social perception of the outgroup in these two basic dimensions. Both groups attributed to the other group an average level of competence and assessed the warmth of the outgroup as below average. These results are consistent with much of the research inspired by the Stereotype Content Model, which indicates that warmth and competence are independent dimensions and group

stereotypes may be heterogeneous. In the case of groups, a negative relationship between these two dimensions may emerge – competent groups may be perceived as low warmth and low competent groups may be perceived as high warmth (Cuddy et al., 2008). When there is intergroup conflict, members of the other group are seen as "lacking" warmth. Our results confirm the conflicting nature of the relationship between supporters and opponents of vaccination. In the case of pro-vaccine individuals, their negative perception of vaccine rejecters' warmth can be explained by the fact that the latter group is often attributed a lack of social responsibility. Their decision not to vaccinate may pose a threat to people who are particularly susceptible to certain diseases and may be infected by unvaccinated patients. In addition, anti-vaccine individuals are often criticized for the fact that increasing numbers of vaccination refusals result in a decrease in collective immunity. On the other hand, the low evaluation of the warmth of pro-vaccine individuals by anti-vaccine individuals may result from the fact that they believe pro-vaccine individuals to support harmful solutions imposed by governments and pharmaceutical companies. Thus, vaccine rejecters may believe that vaccine supporters contribute to harming society and forcing people with different views (i.e., vaccine-hesitant) to act against their beliefs. However, this explanation requires more empirical support.

There was also a similarity in mutual perceptions of outgroup identities by the pro-vaccine and anti-vaccine groups. There were no significant differences in how these two groups perceived each other's identities. Moreover, the level of evaluation of the identity of the outgroup is above the theoretical average. This may mean that both proponents and opponents of vaccination view their opponents as a cohesive, enduring group (rather than as an aggregate of individuals) whose members are similar to each other and share common goals, values, and motives for action. This lay assumption is contrary to studies, particularly of the anti-vaccine group, which indicate this group is rather heterogeneous (Rutjens & van der Lee, 2000).

We also measured the level of identification of the participants with their own group. It turned out that involvement in discussions on vaccination positively correlated with group identity both in the pro-vaccine group and the anti-vaccine group. This result is consistent with contemporary research where a strong emphasis is placed on the various forms of involvement in group functioning, and involvement itself is treated as a fundamental group process (Hogg, 1992). The pro-vaccine group had a stronger overall identity than the anti-vaccine group. It is important to note that all of the identity dimensions (Superiority, Commitment, Importance and Deference) were significantly stronger in the pro-vaccine group. This is in line with our assumptions: research indicates that motives for belonging to the anti-vaccine group may be more diverse and there are various reasons to fight against vaccination programs (see Rutjens & van der Lee, 2000; Rutjens et al., 2018).

According to the concept of in-group bias (e.g., Brewer, 1979; Maass et al., 1996), people judge their own group as better than the outgroup. However, it is not clear whether group members perceive outgroup identity as lower than their own. The results of our study demonstrated that this is indeed true, but only in the pro-vaccine group. The group identity of vaccination supporters was higher than their evaluation of the identity of vaccination opponents in all four dimensions. Opponents of vaccination did not, however, exhibit this bias. Moreover, the anti-vaccine group perceived two identity dimensions (Superiority and Deference) of vaccination supporters as higher than their own. This slightly surprising result is most likely due to vaccination supporters actually having a decidedly higher group identity (in all four dimensions) than vaccination opponents.

Summing up the results of our research, the analysis of intergroup relations allowed us to identify some important things. In terms of stereotypes of outgroup members, traits belonging to the warmth dimension were rated significantly lower than traits of the competence dimension. Moreover, supporters and opponents of vaccination did not differ in this respect. This result confirms the conflicting nature of the relationship between these groups. Second, both proponents and opponents of vaccination perceive their opponents as a cohesive, enduring group, as indicated by the high rating of outgroup's identity. Additionally, contrary to widespread opinion, the group identity of vaccination opponents turned out to be weaker than that of vaccination supporters. Finally, in vaccine opponents, the two dimensions of own group identity were lower than their evaluation of these dimensions in vaccination supporters. This indicates the heterogeneous nature of the anti-vaccine group.

The results of our research confirm previously established patterns in social group psychology and also present new findings. Firstly, this study reaffirmed that direct contact is not a prerequisite for the existence and functioning of social groups. Secondly, we replicated findings from other studies regarding the role of involvement in one's own group. Specifically, involvement in discussions about vaccination was positively correlated with group identity in both study groups. Thirdly, our study confirmed that competence and warmth are two distinct dimensions of stereotypical content attributed to foreign groups. This was demonstrated in our study by the ambivalent perception of members of the opposing group — they were seen as competent but not communal.

The novelty of our project lies mainly in examining both the level of in-group identity and the perceived level of out-group identity in pro- and anti-vaccine groups. We found that both pro- and anti-vaccinationists attributed high levels of identification with their own group to members of the opposing group. Comparing these results with the level of in-group identification among opponents of vaccination allowed us to uncover a misconception held by pro-vaccinationists regarding the coherence, homoge-

neity of goals, values, and motives of action within the opposing group.

Measuring perceptions of the identity of the out-group produced an interesting result, inconsistent with the common research-based belief that people rate their own group as better than the out-group.

Our results may also be of interest from the point of view of the public health literature. After reading these publications, one might get the impression that the anti-vaccinationists are a minority who share similar motives and are collectively opposed to the vaccination mainstream. Our research shows that their group identity is not at all as high as one might assume.

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