

Priming congruence and COVID-19 vaccination intention: a mediation analysis

BACKGROUND

This study took place at the height of the fifth wave of COVID-19 in France, coinciding with stigmatizing communication toward the unvaccinated. We hypothesized that adherence to this communication would facilitate or inhibit the effects of priming on vaccination intention, depending on whether the priming included a dimension of connection to others.

PARTICIPANTS AND PROCEDURE

In a convenience online French sample ($N = 1800$, M age = 26.30), vaccination intention was asked after love priming, no love/prejudice priming, materialism priming, or a control condition. Participants also reported their adherence to restrictive measures, i.e., media control, vaccination pass, and mandatory vaccination.

RESULTS

Vaccination intention was higher in the no love/prejudice and materialism conditions than in the love and control

conditions. Adherence to restrictive measures mediated the effect of prejudice or materialism priming on intention to get vaccinated.

CONCLUSIONS

Implications of these results are discussed in light of the socially situated cognition perspective and the congruence of (a) a societal context of communication toward the vaccine and the unvaccinated, (b) the participant's degree of adherence to that communication, (c) the theme of priming, whether or not related to feeling connected to others. Implications of materialism priming are discussed, and the effect of commitment on intention to get vaccinated.

KEY WORDS

prejudice; love; materialism; socially situated cognition

ORGANIZATION – 1: Paris Cité University, Paris, France · 2: Southern Brittany University, Rennes, France

AUTHORS' CONTRIBUTIONS – A: Study design · B: Data collection · C: Statistical analysis · D: Data interpretation · E: Manuscript preparation · F: Literature search · G: Funds collection

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BACKGROUND

The vaccination campaign against COVID-19 in France was accompanied by intense communication campaigns and by countless debates on the news media. Heads of hospital departments, virologists, epidemiologists, political figures and simple columnists expressed their views on the value of vaccination, on the risks associated with an overall vaccination rate that would remain low, on the risks of long COVID, and on the dramatic situation of hospitals, overwhelmed by the influx of patients. Throughout the epidemic, the number of infections was communicated daily to the public, as well as the number of hospitalizations, patients admitted to intensive care, and deaths. The Prime Minister, the Minister of Health, representatives of health organizations such as the High Authority of Health or the Regional Health Agencies constantly recalled the need for massive vaccination.

In addition to this information, which was likely to arouse fear, anxiety and depression (Holmes et al., 2020; Yildirim & Güler, 2021), communication campaigns have been disseminated to encourage vaccination in France – one of the most reluctant populations in industrialized countries (Brailovskaia et al., 2021; Cambon et al., 2022). These communication campaigns targeted the entire population, or more specific populations (e.g., the elderly or young people). At the beginning of the vaccination campaign in France (December 27, 2020), the emphasis was placed on communication likely to enhance the value of those who would agree to be vaccinated: courage linked to the fact of overcoming apprehension about possible, as yet unknown, side effects; civic-minded behavior with a view to achieving collective immunity based on mass vaccination; concern about not endangering loved ones. The communication campaign launched by the Government in March 2021 shows a grandmother dreaming with delight of her reunion with her grandchildren, who are running towards her and whom she hugs – dreaming at the same time as she gets vaccinated. The love of loved ones was also highlighted in the communication campaign of the Regional Health Agencies New Aquitaine, in the summer of 2021, which featured friends or communities accessing places of conviviality, celebration or travel, thanks to the vaccine. The slogans of this initial phase of vaccination insisted on the values of citizenship, of community; of sharing; the love of oneself is confused with the love of others, for the good of the community: “All vaccinated, all protected”; “Vaccinated, (...) liberated. Together (...)”.

This altruistic strategy, emphasizing the importance of protecting one’s relatives and the most vulnerable populations (Cambon et al., 2022), did not succeed, however, in reducing vaccine hesitancy

in France. At the same time as the health pass was being implemented in France (July 2021), a much more stigmatizing communication was put in place towards the unvaccinated. The non-vaccinated were accused by various journalists, doctors or political personalities of being selfish, irresponsible, conspiratorial, anti-science, or extreme right-wing. The question was raised whether they should be reanimated if they contract a serious form of the disease; it was proposed that they should be forcibly vaccinated; it was envisaged that the law should be changed so that they are considered as voluntarily transmitting death. The Prime Minister, Jean Castex, declared that the unvaccinated “endanger the lives of an entire country” (December 17, 2021), while President Emmanuel Macron suggested that the unvaccinated are irresponsible, and that “an irresponsible person is no longer a citizen” (January 4, 2022). The decision to put pressure on the unvaccinated was accompanied by targeted restriction measures: a health pass (June 2021, extended in July), then a vaccination pass (January 24, 2022).

In total, two main visions underlie the incentives for vaccination. The first approach emphasizes concern for others and the community, and the positive emotion that will be derived from it. The second approach relays negative emotions such as fear or guilt, with submission to authority as an escape. Recently, a handful of studies have begun to explore the impact of prosocial or other-oriented messages on vaccination intention, and protective behaviors against COVID-19 in general. Exposure to a prosocial message has been found to increase acceptance of COVID-19 vaccines (Liao et al., 2022) and intention of COVID-19 self-isolation behavior (Heffner et al., 2021). Induced thoughts of belongingness to family also increase intentions to comply with preventive behaviors (Marinthe et al., 2022). In a similar way, participants exposed to other vs self-focused messaging are more willing to engage in COVID-19 protective behaviors (Gillman et al., 2022) or to receive a vaccine (Courtney et al., 2022). Argote Tironi et al. (2021), however, observed that social approval priming increases vaccine acceptance, whereas altruistic priming does not. Even more specifically, Lamy et al. (2022) asked participants to answer various questions about the person they loved the most, or the person who caused them the most prejudice. Participants then answered questions about their perception of the pandemic and whether they intended to get vaccinated. The results showed that participants primed with love were significantly more likely than those primed with prejudice to report an intention to vaccinate (33.3% vs. 18.3%).

In line with these findings, in the present research we reasoned that people’s intention to get vaccinated is not fixed but rather evolving. As we have seen, the intention to vaccinate is influenced

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by priming effects. Yet at a broader level, the opinion or attitude towards vaccination only makes sense in a social context that is more or less favorable to vaccination. This second aspect has been overlooked in research on the effects of priming on vaccination intention. In accordance with the socially situated cognition (SSC) perspective (Smith & Semin, 2007; Semin & Smith, 2013), social-cognitive processes are *situated* and *distributed*. Therefore we assumed that priming effects on vaccination intention may be susceptible to global, contextual influences. A priming effect on vaccination intention would interact with participants' overall knowledge of what the media, institutional decision-makers and health professionals say about vaccination. Priming effects would have an influence insofar as they are congruent with the societal context. In the present context, we considered that the degree of adherence to restrictive measures regarding vaccination is a reflection, at the individual level, of the general discussion regarding possible restrictive measures for immunization. Therefore, we hypothesized that the effects of priming on vaccination intention will be mediated by the intensity of personal adherence to restrictive measures (H1). We hypothesized that priming will have an effect on vaccination intention (H2), and that adherence to restrictive measures will have an effect on vaccination intention (H3). In line with this reasoning, we decided to test three types of priming: (a) love priming is semantically close (Courtney et al., 2022; Gillman et al., 2022; Liao et al., 2022; Marinthe et al., 2022) or identical (Lamy et al., 2022) to priming procedures that have been shown to be effective for prevention or vaccine acceptance behavior; (b) prejudice, or lovelessness priming was only tested in the Lamy et al. (2022) study but has the interest of being congruent with the prevailing ideas of harshness and coercive threat to the unvaccinated; (c) materialism priming has never been tested in relation to the health issue of COVID-19. However, it seems plausible that this priming is also congruent with a harsh and stigmatizing approach to the non-vaccinated. Previous research has found that materialistic cues, e.g., money primes, tend to trigger a self-sufficient/self-reliant orientation, together with reduced connectedness to others and prosocial behavior (Vohs et al., 2006, 2008). Materialism tends to activate self-oriented values such as hedonism, status, power and achievement, and to deactivate competing values such as selflessness, concern for others and benevolence (Burroughs & Rindfleisch, 2002; Schwarz, 1992). Even more specifically, participants exposed to the idea of money have been found to feel strong (Mok & de Cremer, 2018; Zhou et al., 2009), to be socially distant (Capaldi & Zelenski, 2016; Mogilner, 2010), less helpful (Guéguen & Jacob, 2013), less compassionate or empathetic (Molinsky et al., 2012). Materialism priming thus appears

semantically compatible with the idea that vaccination can contribute to one's own strength, and with the acceptance of the rejection and exclusion of the non-vaccinated.

PARTICIPANTS AND PROCEDURE

PARTICIPANTS

We recruited 1800 participants (F = 1297, M = 503) by posting the questionnaire on various popular social networks (e.g., Twitter, Instagram). Ages ranged from 17 to 96, with a mean of $M = 26.30$ ($SD = 12.30$).

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PROCEDURE

Participants were asked to take part in an online survey about "impressions and reactions in everyday life, what people experience and feel", and were informed that their answers would remain completely anonymous. In the control condition, participants answered questions about the COVID-19 epidemic, such as their fear of being infected, the number of doses of vaccine they had already received, their intention to be vaccinated or re-vaccinated. Three questions were asked about the degree of support for restrictive measures in the context of the COVID-19 pandemic: (a) "In your opinion, should social networks be left completely free of the content they broadcast about the health crisis, or on the contrary, should they be prevented from broadcasting messages that could be qualified as a 'conspiracy'?" The answers ranged from 1 (*they should be left free*) to 7 (*they should be prevented from spreading 'conspiracy' messages*), (b) "In relation to the idea of a vaccine pass (instead of a health pass), you..." 1 (*strongly disagree*) to 7 (*strongly agree*), (c) "In relation to the idea of mandatory vaccination, you..." 1 (*strongly disagree*) to 7 (*strongly agree*). These three questions were not intended to cover the entire field of possible restrictive measures, but they were chosen because they seemed representative of the current debates, and of three types of infringement of fundamental freedoms: freedom of expression, freedom of movement, and freedom of bodily disposal. Finally, participants indicated their gender and age.

In the love and prejudice conditions, these questions were preceded by a series of questions about "the person you have loved the most in your life" or "the person who has caused you the most prejudice in your life", respectively. These two sets of questions were identical to those used by Lamy et al. (2022). In the materialism condition, the questionnaire began with a reminder of the sum of 220 million euros won by a French player in the EuroMillions on October 15, 2021. Then it was asked "what you personally would

do with such a sum?”, “would you buy products from prestigious and expensive brands?”, and “what real estate purchases would you consider?”

The study took place between January 11 and 21, 2022, exactly at the peak of the fifth wave of COVID-19 in France, with over 300,000 infections per day. This period also coincides with the peak phase of the denigration of the unvaccinated in the media and the orientation towards restrictive measures against the unvaccinated. Discussions on the introduction of the vaccination pass, a “disguised obligation” to vaccinate according to a minister, took place in the National Assembly during the same period. The study was approved by the local Institutional Review Board (decision 05012022-1).

RESULTS

Vaccination intention was higher in the prejudice and materialism conditions, as compared to love and control conditions (see Figure 1 for descriptive statistics).

Figure 1

Mean vaccination intention (and standard deviation) according to experimental condition ($N = 1800$)

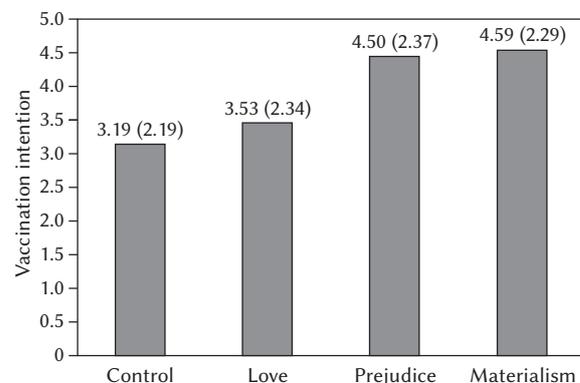


Table 1

Means, standard deviations and correlations between study variables

	<i>M (SD)</i>	1	2	3	4	5
1. Vaccination intention	3.95 (2.37)					
2. Age	26.30 (12.30)	.21*				
3. Vaccine doses	1.64 (1.12)	.54*	.24*			
4. Media control	2.97 (2.08)	.28*	.15*	.21*		
5. Vaccination pass	2.75 (2.10)	.60*	.26*	.50*	.35*	
6. Mandatory vaccination	2.68 (2.11)	.59*	.29*	.51*	.35*	.77*

Note. * $p < .001$.

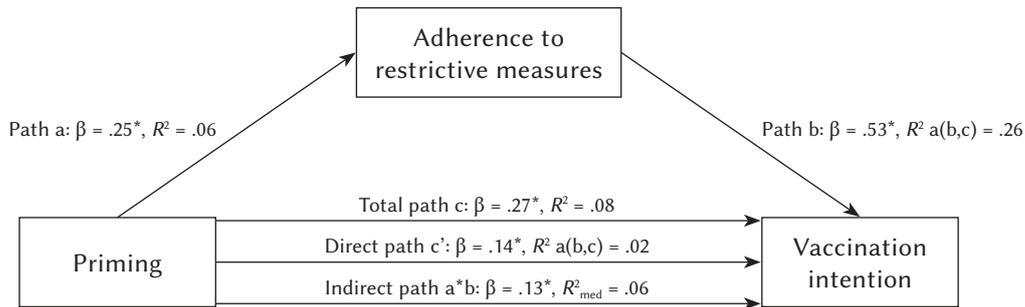
A 4 (priming: love, prejudice, materialism, control) x 2 (participant gender: F, M) ANOVA was performed with vaccination intention as the dependent variable. It revealed a significant main effect of priming, $F(3, 1792) = 35.50, p < .001, \eta^2 = .06$. However, neither the main effect of gender, $F(1, 1792) = .002, n.s.$, nor the interaction effect between priming and gender, $F(3, 1792) = .80, n.s.$, was significant. Post hoc analysis revealed that vaccination intention was significantly higher in the prejudice condition, as compared to the control condition, $t(1792) = 7.88, p_{\text{tukey}} < .001$, Cohen's $d = .57$. Vaccination intention was also significantly higher in the materialism condition, as compared to the control condition, $t(1792) = 8.05, p_{\text{tukey}} < .001$, Cohen's $d = .62$. Vaccination intention in the love condition was not significantly different from the control condition, $t(1792) = 1.38, p_{\text{tukey}} = .51$, Cohen's $d = .10$, but it was significantly lower than in the prejudice [$t(1792) = -6.35, p_{\text{tukey}} < .001$, Cohen's $d = -.47$] and materialism conditions [$t(1792) = -6.60, p_{\text{tukey}} < .001$, Cohen's $d = -.51$].

Scores related to adherence to restrictive measures, i.e., media control, vaccine pass, and mandatory vaccination, were positively correlated (see Table 1). These scores were collapsed to an adherence to restrictive measures score (Cronbach's $\alpha = .74$).

Further, an ANOVA was performed with priming as the independent variable and adherence to restrictive measures as the dependent variable. A significant main effect of priming appeared, $F(3, 1796) = 44.8, p < .001, \eta^2 = .07$. Post hoc analysis revealed that adherence to restrictive measures was significantly higher in the prejudice condition, as compared to the control condition, $m = 9.16$ vs. $m = 6.75, t(1796) = 7.32, p_{\text{tukey}} < .001$, Cohen's $d = .49$. Adherence to restrictive measures was also significantly higher in the materialism condition, as compared to the control condition, $m = 10.17$ vs. $m = 6.75, t(1796) = 10.41, p_{\text{tukey}} < .001$, Cohen's $d = .69$. Adherence to restrictive measures in the love condition was not significantly different from the control condition, $m = 7.50$ vs. $m = 6.75, t(1796) = 2.26, p_{\text{tukey}} = .10, n.s.$

Figure 2

Standardized regression coefficients and squared correlation effect sizes for the relationship between priming and vaccination intention as mediated by adherence to restrictive measures. Control vs. prejudice priming

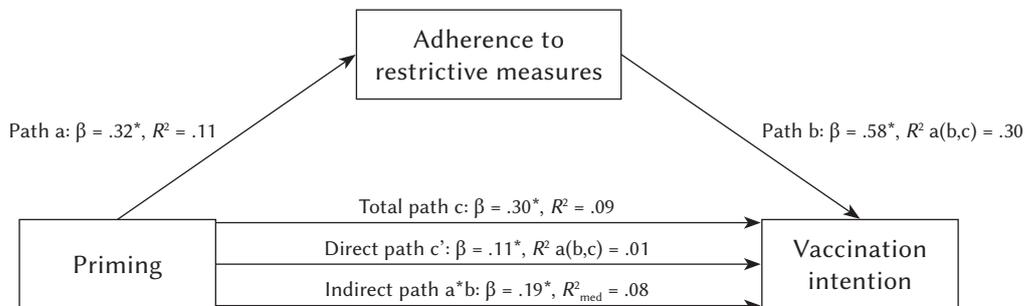


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Note. * $p < .001$.

Figure 3

Standardized regression coefficients and squared correlation effect sizes for the relationship between priming and vaccination intention as mediated by adherence to restrictive measures. Control vs. materialism priming



Note. * $p < .001$.

MEDIATION ANALYSIS

Data were analyzed to explore the mediating role of adherence to restrictive measures in the relationship between priming and vaccination intention. First, control and prejudice conditions were contrasted ($N = 900$). The full regression model was statistically significant, $R^2 = .34$, adj. $R^2 = .34$, $F(2, 897) = 230.00$, $p < .001$. Path analysis (see Figure 2) showed that priming and adherence to restrictive measures significantly predicted vaccination intention. However, only 1.9% of the variance ratings of vaccination intention was explained by the direct effect of priming, whereas 5.7% was explained by the indirect path, with priming significantly predicting adherence to restrictive measures, and adherence to restrictive measures significantly predicting vaccination intention.

When contrasting control and materialism conditions ($N = 900$), a similar pattern of results was found (see Figure 3). The full regression model was statistically significant, $R^2 = .39$, adj. $R^2 = .39$, $F(2, 897) = 289.20$, $p < .001$. Priming and adherence to restrictive measures significantly predicted vaccination intention. The indirect path explained 7.8% of the

variance ratings of vaccination intention, with priming significantly predicting adherence to restrictive measures, and adherence to restrictive measures significantly predicting vaccination intention. The direct effect of priming on vaccination intention, despite being statistically significant, explained only 1.0% of the variance ratings of vaccination intention.

DISCUSSION

This research took place at the highest point of the media campaign, in France, aiming at presenting the non-vaccinated as potentially dangerous and irresponsible people, and justifying harsh measures against them. We predicted that priming would have an influence on vaccination intention, and that adherence to restrictive measures would have an influence on vaccination intention. We also hypothesized that priming effects on vaccination intention would be mediated by the degree of adherence to restrictive measures. The results obtained are consistent with these assumptions, but they are restricted to prejudice and materialism priming. Love priming had

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no effect on intention to vaccinate, nor on the level of adherence to restrictive measures. In the case of prejudice priming or materialism priming, however, priming increased the level of adherence to restrictive measures, as well as the intention to be vaccinated. The results also revealed the mediating role of adherence to restrictive measures.

In addition, we found that the intention to vaccinate was positively correlated with the number of doses of vaccine already received, suggesting a commitment effect (Kiesler, 1971). In addition, this commitment effect linked to previous vaccinations against COVID-19 may be favored by the irrevocable, public and personally costly character, since it commits health, of the vaccination act (Joule & Beauvois, 2010; Kiesler & Sakumura, 1966). In this sense, the differences obtained by priming on the intention to vaccinate are worth noting, as they concern a very personal question, with important stakes, and in one of the most vaccine-averse industrialized countries. One might think that one year after the start of the vaccination campaign, opinions would be fixed and uninfluenced, but this research shows that, on the contrary, they can evolve if the priming theme resonates with the overall societal context. We also found that vaccination intention correlated positively with participant age. This result is consistent with the fact that younger people know that they are less likely than older people to develop a severe form of the disease. And it has been shown that perceived vulnerability to COVID is a major determinant of intention to get the vaccine (Dillard et al., 2022). Perceived vulnerability increases with age and leads to greater vaccine acceptance. The mediation effect obtained indicates that the direct effect of priming on vaccination intention, although statistically significant, explains only a very small part of the variance. The effect of priming on vaccination intention is primarily mediated through adherence to restrictive measures. This adherence to restrictive measures can be seen as the internalization of the discourse maintained at that time by many journalists, scientists and politicians, a discourse that includes the stigmatization of the non-vaccinated and the envisaged use of increasingly coercive measures. Ultimately, the trigger for vaccination intention appears to be a triple congruence between the priming theme, the societal context, and the participant's personal opinion. It is striking that the intention to vaccinate was significantly higher with prejudice than with love priming, whereas in the Lamy et al. (2022) study the opposite effect was found. The most likely explanation, in our opinion, for this apparent contradiction is that provided by the theory of socially situated cognition (Smith & Semin, 2007; Semin & Smith, 2013). The Lamy et al. study took place in January 2021, at the very beginning of the vaccination campaign, when there was a focus on getting vaccinated to protect those you love,

and when the newly vaccinated were portrayed very positively. The present research took place one year later, when the unvaccinated were portrayed very negatively and vaccination was a way to escape criticism and restraint. Motivation to "share reality" with others (Semin & Smith, 2013) may thus be extended, not only to others with whom we have interactions, but to a broader, distal social environment.

To our knowledge, this study is the first to reinterpret a priming process through its relationship to an encompassing societal context. Our results indicate that adherence to restrictive measures powerfully influenced vaccination intention, and that this adherence was itself influenced by prejudice or materialism priming. In the case of prejudice, the idea of hostility towards others seems to resonate with the hostile communication campaign towards the vaccinated, which was at its peak during this period, and with the three questions on restrictive measures that summarized this hostile communication. There seems to be congruence between prejudice priming, the political and media stigmatization of the non-vaccinated, and restrictive measures towards them. In this situation of congruence, the intention to vaccinate was increased.

In the case of materialism, which tends to restrict feelings of closeness to others and prosocial behavior, and to increase the motivation to be strong and self-reliant, adherence to restrictive measures may represent the desire for all to be strong and healthy because they are vaccinated, and for those who refuse this social pact to be punished. Materialistic priming seems congruent with the idea of punishing the non-vaccinated, for example by reducing their freedoms. It also seems congruent with the prevailing discourse, which at the time of the study insisted on the respect of health authorities that could eventually constrain the citizen. As with prejudice priming, the congruence between materialism priming, ambient discourse, and the degree of adherence to restrictive measures was accompanied by an increase in vaccination intention. Regarding love priming, congruence with the societal context existed in January 2021 when it was a matter of getting vaccinated out of love for those we love. The results of this study (Lamy et al., 2022) showed an increase in vaccination intention after love priming. In the present study, by contrast, love priming was no longer congruent with an overall communication focus on stigma and coercion, and it no longer produced any effect on vaccination intention. Overall, our results seem consistent with the spreading-activation model (Collins & Loftus, 1975), where activation of a concept – here, through priming – causes activation of associated concepts. In this sense, the activation of prejudice or materialism, but not love, would have activated the idea of harshness and coercion toward others. The idea that priming has a greater influence when it is congruent with the societal context is, however, only an explanatory hypothesis at

this stage. Indeed, in the present study this societal context was not measured, but only a narrow set of personal opinions linked to the global debate. This is why the main limitation of this study is certainly its non-replicability. The priming effects can be tested again, on other populations, but the societal context that seems to explain their effects cannot be replicated. The communication contexts of January 2021 and January 2022 are unique and opposite, spanning only a few months. Thus, future research should in turn study priming processes in the context of a societal context that is strongly biased in the direction of some of the priming modalities.

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