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Effective incentives for increasing COVID-19 vaccine uptake

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In our previous article, we reported that 31% of the participants in Turkey and 14% in the UK were unsure about receiving the COVID-19 vaccine (Salali & Uysal, 2020). As of September 2021, around 80% of the adult population in the UK, and 60% in Turkey received two doses of COVID-19 vaccination. Vaccination programs across many countries will likely come to a halt in the near future, as the remaining unvaccinated people mainly consist of those who are hesitant towards or refuse the vaccination. To increase vaccine uptake, governments have implemented strategies from cash rewards to endorsement of vaccines by celebrities. Examining the effectiveness of these strategies and developing informed policies is crucial to advancing protection against COVID-19. In this study we investigated the effectiveness of prestige, conformist and risk-based vaccine incentives in an anonymous online survey using demographically representative samples from the UK (n= 1533), US (n= 1550) and Turkey (n= 1567) (see Salali & Uysal, 2021 for more information on the sample).

People tend to learn from and copy the behaviours of highly respected individuals in a group. Such prestige-biased learning can be adaptive if prestige is associated with high skill and knowledge (Henrich & Gil-White, 2001) and may affect vaccination decisions (Arnot et al., 2020). Indeed, governments have implemented vaccine promotion strategies inspired by prestige-bias during the COVID-19 pandemic, with several politicians and celebrities receiving the vaccine in front of cameras. The domain of prestige, however, may influence the effectiveness of these strategies. To understand which prestige domain exerts more influence on vaccination decisions, we examined the effectiveness of incentives when 1) an expert scientist, 2) the president, 3) a supported politician, 4) a celebrity, and 5) a religious leader were hypothetically vaccinated.

People also tend to follow the behaviours of their peer group members. This conformist social influence may support vaccine uptake if hesitant individuals observe other people in their community getting vaccinated (Schmelz & Bowles, 2021; Taylor et al., 2020). To test the effectiveness of conformist incentives, we asked participants how effective observing a family member or friend getting vaccinated is at increasing their chances of receiving the vaccination.

Messages that stress the personal health risks during a pandemic can also promote vaccine uptake (Motta, Sylvester, Callaghan, & Lunz-Trujillo, 2021). Such risk-based incentives likely increase risk avoidance behaviour and vaccine intention by inducing anxiety (Salali, Uysal, & Bevan, 2021). We measured the effectiveness of risk-based incentives by surveying participants about their chances of getting vaccinated if someone they knew got sick with or died from COVID-19.

The effectiveness of vaccine incentives may also depend on cultural norms and beliefs and may thereby differ across countries (Arnot et al., 2020). The prevalence of COVID-19 conspiracies, for example, is higher in some countries than others and associated with vaccine hesitancy (Salali & Uysal, 2020, 2021). Using a cross-cultural design enabled us to investigate whether the effectiveness of vaccine incentives differs across countries. Participants rated the effectiveness of the incentives on a scale of 1-5. Table 1 shows the mean effectiveness score of each incentive with respect to participants' COVID-19 vaccination intention. We conducted an ANOVA followed by a Tukey's HSD test to investigate if the mean effectiveness scores differed by 1) incentive type (all incentives listed on Table 1), 2) COVID-19 vaccination intention (no/not sure/yes or already did) and 3) country. The data and R code are available at OSF: <https://osf.io/jpva7/>.

The three most effective incentives in all three countries were vaccination of an expert scientist, friends or family members getting vaccinated and knowing someone dying from the disease (Table 1). The effectiveness score of an expert scientist getting vaccinated

was significantly higher than those of all other incentive types (Tukey's HSD, $p < 0.001$). The effectiveness of incentives declined as COVID-19 vaccine intention changed from yes to no (Table 1). Incentives were significantly more effective at increasing chances of vaccination among vaccine-hesitant people than among those who refused the vaccine (Tukey's HSD, $p < 0.001$). Although our findings in this study and elsewhere indicate that general and COVID-19-specific vaccine hesitancy and mistrust are higher in Turkey than in the UK and the US (Salali & Uysal, 2021), the reported effectiveness of incentives was also the highest in Turkey (Table 1, Tukey's HSD, $p < 0.001$ for all pairwise comparisons). One reason may be that the tightness/looseness score is higher in Turkey than in the US and UK, indicating that enforcement of social norms on COVID-19 will be more successful (Gelfand et al., 2021). Therefore, an informed vaccine promotion strategy is likely to increase COVID-19 vaccine uptake in this country, especially if prestige and conformist-based incentives can help to establish a social norm around vaccination.

Among prestige-based incentives, vaccination of an expert scientist was significantly more effective than any other prestige-based incentive across all countries (Table 1, Tukey's HSD, $p < 0.001$). This finding suggests that the domain of prestige is important when people choose to copy others. For vaccination, people pay attention to, and possibly copy, the behaviour of those individuals who are known for their knowledge on vaccines. Although the influence of an expert scientist getting vaccinated was less impactful for participants who refused a COVID-19 vaccine, it remained the most effective vaccine incentive for such participants (Table 1). Vaccination of an expert scientist was also among the most effective incentives for vaccine-hesitant participants (Table 1). Therefore, across countries, positive messages about COVID-19 vaccines by expert scientists are likely to be more effective at increasing vaccine uptake than those by politicians or other prestigious individuals.

Among vaccine-hesitant participants conformist and risk-based incentives were the most effective (Table 1). These findings affirm that observing friends and family getting vaccinated may increase vaccine uptake through conformist bias. Observing others remaining healthy after the vaccination may also encourage hesitant people by reducing anxiety about negative side effects (Taylor et al., 2020). Furthermore, knowing others who become sick or die from the disease can be an effective incentive as it accentuates the saliency of health risks. It is important to note here that conformist and risk-based incentives were significantly more effective than prestige-based incentives with the exception of an expert scientist getting the vaccine (Tukey's HSD, $p < 0.001$ for all pairwise comparisons). There was no difference between the effectiveness of conformist and risk-based incentives (Tukey's HSD, conformist-sickness: $p = 0.09$, conformist-death: $p = 0.9$, death-sickness: $p = 0.5$).

Our findings have policy applicability and suggest that positive vaccination messages delivered by expert scientists, vaccination of friends and family, and witnessing the risk of disease can be effective at increasing vaccine uptake.

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Table 1. The mean effectiveness score of various incentives on the chances of vaccine uptake by COVID-19 vaccination intention and country

<i>My chances of getting vaccinated would increase if...</i>	UK				US				TURKEY			
	Yes / Already did (N = 1271)	Not sure (N = 169)	No (N = 93)	Total (N = 1533)	Yes / Already did (N = 949)	Not sure (N = 318)	No (N = 283)	Total (N = 1550)	Yes / Already did (N = 740)	Not sure (N = 646)	No (N = 181)	Total (N = 1567)
An expert scientist got vaccinated	4.07	3.10	2.28	3.85	4.00	2.90	2.14	3.43	4.21	3.71	2.78	3.84
The president got vaccinated	3.62	2.72	2.05	3.42	3.76	2.53	1.88	3.16	3.68	2.97	2.54	3.25
A politician I support got vaccinated	3.43	2.61	2.04	3.26	3.42	2.38	1.82	2.92	3.25	2.65	2.30	2.90
A celebrity I like got vaccinated	2.86	2.31	1.83	2.74	2.89	2.09	1.64	2.50	3.03	2.97	2.20	2.91
The religious leader of my community got vaccinated	2.78	2.27	1.75	2.66	3.01	2.20	1.78	2.62	3.10	2.65	2.17	2.81
One of my friends or family members got vaccinated	3.75	3.03	1.84	3.55	3.77	2.85	1.98	3.25	3.93	3.80	2.63	3.73
Someone I knew got coronavirus	3.72	2.88	1.94	3.52	3.54	2.71	1.94	3.08	3.92	3.80	2.59	3.72
Someone I knew died from coronavirus	3.74	2.92	2.04	3.55	3.63	2.74	1.94	3.14	3.98	3.86	2.68	3.78
Overall	3.50	2.73	1.97	3.32	3.50	2.55	1.89	3.01	3.64	3.30	2.49	3.37

Note. The participants were asked to rate the effectiveness of each incentive at increasing their chances of getting vaccinated. The response scale was: not effective at all (1), slightly effective (2), moderately effective (3), effective (4), very effective (5). The numbers indicate the mean effectiveness score for the corresponding statement and COVID-19 vaccine intention. The survey was conducted in March-April 2021.