"The Neuroethics of Vaccination Acceptance Among US College Students: Explicit and, Game Theory Based, Implicit Measures Of Altruism,"

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BACKGROUND

At the outset of the COVID-19 pandemic vaccine science had advanced to the point where the development of a highly effective vaccination and its FDA approval took under one year. We were on the threshold of a public health success that did not happen, because vaccination uptake hinged on individual behavior. The weak link in the chain. Even prior to COVID-19, vaccination refusal was identified by the World Health Organization one of the most significant threats to public health. The vaccine intentions/acceptance literature is extensive, and has focused on psychological antecedents (confidence, constraints, complacency, calculation, collective responsibility), with variations for different diseases and groups. A key demographic group in the current pandemic is young adults, who are not threatened by the worst outcomes of COVID-19, and yet can spread the disease to more vulnerable populations.

STUDY AIMS

We hypothesized that the drivers of acceptance in this group, therefore, likely align with prosocial values and attitudes of collective responsibility. Therefore, as part of our comprehensive online study of the impact of COVID-19 on college student MH, we examined the impact of altruism measured in two ways – explicitly through self-report of values, based on the well-studied Moral Foundations Questionnaire (MFQ), and implicitly, based on behavior elicited in a game theory task known as the ultimatum game (UG).

METHODS

1,636 undergraduate students attending a U.S. college or university completed our comprehensive online survey between September 2020 and March 2021. Among the items in that survey, students reported on their values in the MFQ, responded to monetary division offers in the UG, and reported their vaccination status and/or intentions. Multivariate logistic regression analyses examined independent associations of altruism /social fairness elicited via the Fairness module of the MFQ (explicit) and the Ultimatum Game (implicit) with COVID-19 vaccine attitudes, controlling for demographic and educational factors.

RESULTS

84% of students reported they had already been vaccinated, or would do so when it was made available. Another 16% did not intend to be vaccinated. Analyses indicated that both measures of altruism/social fairness were associated with willingness to be vaccinated. The AOR for accepting the vaccine based on the MFQ-Fairness subscale was 1.32 (p=.004), and the AOR for accepting the vaccine based on altruistic decisions in the UG (accepted less than equal vs accepting only equal or greater offers) was 2.79 (p=.043).

Table. Logistic Regression Analysis predicting Pro-vaccination Status

	Adjusted OR	Adjusted OR
Female	0.95	0.97
Age	0.92	0.92
Race/ethnicity (ref= Other)		
White, not Hispanic	4.04*	3.06*
Black, not Hispanic	0.49	0.52
Asian	18.34**	17.91**
Hispanic	2.35	2.04
Either parent has earned at least a bachelor's degree (vs both not)	1.30	1.55
Attending a 4-year (vs 2-year) college/university	1.16	1.09
Moral Foundation Questionnaire's Fairness subscale	1.15*	---
Accepting an unfair (vs only fair/neutral) offer on the Ultimatum Game	---	2.62*

CONCLUSIONS

Many studies have explored vaccine hesitancy based on manifest reasons given by individuals. These tend to offer limited insights into the underlying attitudes that are actually driving these decisions. This study supported our hypothesis that vaccine decisions were driven by an individual's characteristic concern for others- her altruism or fairness. This was shown in two measures of altruism.
1- The explicit self-reporting that Fairness is a highly prioritized value in the MFQ.
 2- Implicitly by altruistic choices in the ultimatum game in which one's altruism is revealed by willingness to take a smaller piece of the pie in order to ensure that both parties get some reward. The UG measure was more strongly associated with vaccine acceptance, illustrating the added value of economic tasks in health behavior research.