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The role of grandiose and vulnerable narcissism on mask wearing and vaccination during the COVID-19 pandemic

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Abstract
In a large nationally representative study in the United States, we explored the role of grandiose and vulnerable narcissism on adhering to protective measures against COVID-19. Controlling for one's politics, perception of risk, state policies, and important demographics, we find higher grandiose narcissism predicts less vaccination and less mask-wearing, but more telling other people to wear a mask, if one wears a mask. The individual facets of higher entitlement/exploitativeness predicted less mask-wearing and less vaccination while higher authority/leadership-seeking predicted telling others to wear a mask, but not getting vaccinated. Regarding vulnerable narcissism, higher self-centered/egocentrism predicted less mask-wearing or vaccination, while higher oversensitivity-to-judgement predicted more mask-wearing and vaccination. Our results are consistent with expectations that reflect narcissism's multidimensionality, and present a nuanced picture of narcissism's role in adhering to protective policies.

Keywords Narcissism · Covid-19 · Public goods · Grandiose · NPI · Vulnerable · HSNS

Few events have defined and divided the public in the United States more than the COVID-19 pandemic (Bartusevicius et al., 2021). Despite a global death toll in the millions, many people will not wear masks in public to stop the spread of the virus and are unwilling to get vaccinated to reduce the probability of harm to themselves. Others demand mask-wearing, leading to public conflict and even several deaths (Bromwich, 2020). Understanding these behaviors is a social and public health imperative.

In a relatively short time, there has been some headway toward understanding why people comply with protective policies. Those who are less risk-averse, less concerned of getting sick or do not believe the virus is serious, are less likely to wear a mask in public, social distance, or get vaccinated (Choma et al., 2021; Müller & Rau, 2021). These beliefs are influenced by the information and misinformation one is, and chooses to be, exposed to (Pennycook et al., 2020; Simonov et al., 2020). In this regard, protective policies against COVID-19 have become more politicized than most any other modern issue (Hart et al., 2020). For example, during one of the most watched U.S. infotainment programs, Tucker Carlson called for his viewers to not wear a mask, confront people who do, and demand they take theirs off (Sullivan, 2021). Political orientation is a predictor of singular importance on which news source the pubic chooses (Ditto et al., 2019; Washburn & Skitka, 2018), what information they believe, how they (de)legitimize science (Iyengar & Massey, 2019), share information (Barberá et al., 2015) and even how they misremember it to fit their belief systems (Frenda et al., 2013). Given rhetoric from elites and party leaders, extant studies (Allcott et al., 2020; Calvillo et al., 2020; Hsiehchen et al., 2020) consistently find that conservatism and Republicanism are associated with perceiving less personal vulnerability to COVID-19, a lack of belief in the seriousness of the virus, beliefs that the media exaggerates both contagion and impact of the virus, and conspiracy theories around vaccination as form of government control.

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Far less understood, are the roles of personality characteristics on mask-wearing and vaccination. Narcissism is one trait that appears well suited to help explain, in part, individual differences in adhering to protective policies. The two theoretically and empirically distinct forms of narcissism, grandiose and vulnerable, both have strong and potentially opposing theoretical connections to compliance and engaging in protective policies. Combined they capture competing and often contradictory elements of human behavior surrounding the well-being of others versus self-interest, self-promotion and insecurity against social sanction (Campbell et al., 2005; Miller et al., 2011). Both forms of narcissism are continuously distributed unimodal traits, where everyone has some degree of narcissism to greater or lesser extents, akin to other temperament traits. Here, in a large nationally representative study in the United States, we explored the role of grandiose and vulnerable narcissism on adhering to protective measures against COVID-19, controlling for one's politics, perception of risk, state policies, and important demographics.

Theoretical Expectations of Grandiose Narcissism's Role in Adhering to Protective Policies Against COVID-19

Grandiose narcissism has both agentic and antagonistic dimensions. The agentic factors are reflected by a strong approach orientation, the pursuit of agentic goals, including social status and autonomy, a strong desire for others to see one as important, intelligent and worthy of admiration. The antagonistic elements include feelings of superiority and entitlement (Zajenkowski & Dufner, 2020). Those higher in grandiose narcissism have a strong self-focus, are less sensitive to criticism, have less desire to reciprocate when other people act in their interest, tend to ignore the needs of others and value others in an instrumental way, specifically in their usefulness to fulfilling their goals (Atlas & Them, 2008). The focus on the self, willingness to exploit others for personal gain, desire to elevate one's social status regardless of the costs to others result in a negative relationship with collective action and maintaining public goods (Van Vugt, 2009).

The Narcissistic Personality Inventory (NPI, Raskin & Hall, 1981) remains the most commonly used measure to capture grandiose narcissism in the general public. Decades of refinement resulted in a consensus that both a single overall grandiose narcissism score and the different components of grandiose narcissism be explored independently because they often have divergent influences on traits of interest (Campbell et al., 2002; Miller et al., 2011, 2017). The original 40 items have been effectively reduced to a 25-item scale to produce a general grandiose narcissism score and subdimensions of Leadership/Authority Seeking (self-perceived leadership ability, desire for authority, and social potency), Grandiose Exhibitionism (self-absorption, vanity, and exhibitionism), and Entitlement/Exploitativeness (entitled beliefs/behaviors and manipulativeness) (Ackerman et al., 2011).

Overall, those higher in grandiose narcissism should be less likely to wear a mask in public or get vaccinated. One reason for such behavior is to assure those higher in narcissism that they stand out, if the consensus behavior is the opposite one, i.e., wearing masks and getting vaccinated, which is the modal behavior in the period and context studied in this paper. Not wearing a mask while others are wearing one can also contribute to similar levels of (perceived) safety, without the associated discomfort or effort. While the first reason would suggest a stronger effect for the grandiose exhibitionism subdimension, the second one would indicate an especially strong relationship for the entitlement/exploitativeness subdimension of grandiose narcissism.

Individuals have expectations regarding how others should behave, and such met or unmet expectations often contribute to the success of some policies or potential conflicts around how individuals behave in a given situation. Overall, we expect that similar dynamics will manifest for expectations from others as for individual behavior regarding mask-wearing, with those scoring higher in grandiose narcissism expecting less mask-wearing from others, on average. Undoubtedly, a more complex set of expectations should include one's own position regarding mask-wearing. Generally, those wearing a mask expect others to wear a mask and vice versa. However, in the rare cases of misalignment between these two, there are many possible ways in which narcissism nuances expectations regarding the behavior of others. For example, those scoring higher in leadership/authority-seeking should expect others to mimic their own behaviors, increasing the overlap of one's own behavior and those desired from others. In contrast, grandiose exhibitionists should value uniqueness more and to fuel such a position, they would expect others to do differently then they themselves behave. Finally, those mask wearers with a higher sense of entitlement/exploitation should still expect the same from others, but the non-mask wearers scoring higher in this trait could still expect others to wear a mask, if they believe that increases their own safety. We report results related to expectations for other people wearing masks, but unfortunately, we are not able to test all potential sources of heterogeneity using our data and we refer to this in the discussion.

However, once a particular behavior is adopted by an individual (wearing or not wearing a mask), those higher in grandiose narcissism should also be more likely to tell others in public to do so, most poignantly for those higher in the leadership/authority-seeking and grandiose exhibitionism

facets, as means to display their authority and gain social status. This is one step beyond simple expectations (see above), involving actively seeking to engage with others and swaying their views to change their behaviors. Indeed, while those higher in narcissism generally have a proclivity for engaging in antisocial rather than prosocial behaviors, they are strategic and can act pro-socially to receive benefits or status (Konrath et al., 2016). In such cases, if the self-focus or individual position is to wear a mask, the agentic elements of grandiose narcissism, including exhibitionism should facilitate the expression and engagement with others to steer them in the desired direction. In this way, the different subfacets of grandiose narcissism can help differentiate between often competing types of narcissistic influence.

It is important to note, that actions that result in prosocial outcomes, but are grounded in self-promotion, status seeking, or self-interest are not to be confused as prosocial behaviors. Rather, those higher in narcissism are generally less responsive to others prosocial behavior, have little recognition of communal needs (Chen et al., 2021) and are unaware or remain indifferent to social pressures, unless doing so will feed self-enhancement motivations such as the potential for admiration.

Theoretical Expectations of Vulnerable Narcissism's Role in Adhering to Protective Policies Against COVID-19

Vulnerable narcissism is characterized as a defensive mechanism against emotional insecurity, hypersensitivity and introversive self-absorbedness. The two dimensions of vulnerable narcissism, self-centered/egocentrism and oversensitivity-to-judgement (rejection sensitivity) are intuitively matched to both rhetoric and public behaviors surrounding protective policies against COVID-19. Vulnerable narcissism is largely uncorrelated to grandiose narcissism, with the exception of egocentrism and entitlement, but related to a number of psychopathologies, including guilt, fragile self-esteem, insecure attachment, emotional instability, and inauthenticity (Ackerman et al., 2011; Atlas & Them, 2008). Those higher in vulnerable narcissism are more sensitive to criticism and avoid discomfort to manage negative emotions in social relationships (Pincus & Lukowitsky, 2010).

Vulnerable narcissists also naturally do not engage in prosocial behaviors for altruistic reasons (Jauk et al., 2017). However, this is dependent on the dimension, the presence of social pressure, and the ability to avoid accountability for one's actions (Kaufman et al., 2020). The self-centered/egocentrism component is rooted in the ability to express entitlement without risk, while the rejection sensitivity factor is explicitly concerned about negative social evaluation and internalization of others views of self (Miller et al., 2011). Vulnerable narcissism is related to less empathy, but when anonymity is not possible, for example, that is, when one cannot hide, such as not wearing a mask in public, then social pressures overcome selfishness and entitlement and can result in prosocial outcomes such as wearing a mask. Accounting for the individual's concern about COVID-19, state laws on masking, and given the strong public messaging that people should adhere to protective policies not for themselves, but for the benefit of others, those higher in the selfishness/egocentrism dimension of vulnerable narcissism should be less likely to wear a mask, caring more about the self than others, and less likely to get vaccinated. On the other hand, those higher in oversensitivity-to-judgement should be more likely to wear a mask, as they cannot hide not doing so, but less likely to tell others to do so, and more likely to get vaccinated or at least say they are, for fear of social sanction.

Prior Empirical Findings: Narcissism and Adherence to Policies Against COVID

Given the relatively recent nature of the pandemic, there remains only a handful of empirical studies on the current relationship. Nevertheless, a series of important works were carried out on short notice to provide immediate insights on grandiose narcissism's role on adhering to protective policies against COVID. These however, returned conflicting results. Hardin et al.'s (2021) US study (N = 412), Nowak et al.'s (2020) Polish study, and Triberti et al.'s (2021) Italian study (N = 465) all rely on a 4-item subset of the "Dirty Dozen" measure (DD going forward). Together narcissism was either not consistently or significantly related to preventative actions, vaccination, or mask-wearing. This appears contradictory to the strong theoretical connections between grandiose narcissism's agentic (status seeking, engagement) and antagonistic traits (selfish, entitled, exploitative) that we outline above. There are several potential reasons for the lack of empirical support, such as limitations of measurement, and differences in sample location and timing, to include different country populations with differing laws and social norms, and the use of convenience samples. Importantly the use of the 4-item DD measure provides a very restricted view of narcissism that does not capture grandiose narcissism's multi-dimensionality (e.g., it at best explains around 10–25% of the variation of superiority and exhibitionism); or meaningfully capture vulnerable narcissism (Jonason & Luévano, 2013; Kajonius et al., 2016; Miller et al., 2010, 2012).

Two other grandiose measures also returned inconsistent results: Zajenkowski et al. (2020) found in Poland (N = 263), those higher in narcissistic rivalry (see Narcissism Admiration and Rivalry Questionnaire -NARQ, Back et al., 2013), which is an alternative re-conception and measurement of

Table 1 COVID-19 outcomes and effective sample sizes for later regression models

Question wording		% Yes	N1	N2
(1) Do you regularly wear a face mask in public spaces?		87.5	1070	1093
(2) Do you think other people should also wear a face mask in public spaces?		79.3	1070	1093
Only if respondent said other people should wear a face mask (n = 900):	(3) Have you ever told other people who were not wearing a mask to wear a mask when out in public?	26.4	881	895
(4) Once a COVID-19 vaccine becomes available, will you get vaccinated?		70.4	913	932

% Yes includes those who answered with "I have already received at least one dose of a COVID-19 vaccine" ($n = 285$). This option was used given the date range of data collection. For the vaccination question we had a "Don't know" option, thus those not wanting to get vaccinated are either "No" ($n = 248$) or "Don't know" ($n = 162$). We had only one respondent who skipped the question block. Weighted proportions reported. This block included one additional COVID-19 related question to which we return later. N1 stands for the effective regression sample sizes for each outcome when grandiose narcissism related variables are included; N2 stands for the effective regression sample sizes for each outcome when vulnerable narcissism related variables are included. Models are introduced below

grandiose narcissism and correlated with the Narcissistic Personality Inventory's (NPI) entitlement/exploitativeness dimension, were less likely to comply with COVID-19 restrictions. In contrast, in the UK, rivalry was unrelated to COVID-19 behaviors, but instead the other half the NARQ, admiration, which is correlated with the NPI's authority-seeking and grand exhibitionism dimensions, predicted higher perceived susceptibility to COVID-19 (Venema & Pfattheicher, 2021). Venema and Pfattheicher (2021) also found grandiose narcissism predicted lower perceived susceptibility of infection.[1]

Overall, the relationships between grandiose narcissism and engaging in protective actions against COVID-19 are conflicting at best, and the role of specific subdimensions remains unknown. The latter is critically important because a strong consensus has formed that it is necessary to explore the different components of narcissism alongside the full measures (Miller et al., 2011). This is true because abbreviated scales lack the ability to accurately parse out grandiose narcissism's agentic and antagonistic dimensions (Ackerman et al., 2011), and these subdimensions often have divergent relationships with traits of interest (Fazekas & Hatemi, 2020; Miller et al., 2011), which are masked by overall sum scores of the combined measures.

Unlike grandiose narcissism, however, the role of vulnerable narcissism on COVID-19 protective measures has received almost no attention. We seek to remedy this because those elements that motivate anxiety reduction, including insecurity, make it an ideal candidate for engaging in behaviors to reduce social sanction, which should result in actions that comply with protective policies (Miller et al., 2011).

What has remained absent in exploring the role of narcissism on COVID-19 protective measure is a large nationally representative study, with well-validated complete measures of grandiose and vulnerable narcissism, to include their subdimensions. It is to this data we now turn.

Method

Sample and Data Collection

The data was collected through phone and internet by YouGov between March 10–22, 2021; 1,100 respondents in the U.S. were matched to a nationally representative sampling frame on gender, age, race, and education. The frame was constructed by stratified sampling from the full 2018 American Community Survey (US Census) with selection within strata by weighted sampling with replacements. The U.S. provides an important population to study. According to the Centers for Disease Control (CDC), of countries that accurately report COVID information, the US has the most cases of COVID, the most deaths, and is among the highest infected per capita. Descriptive statistics reported in the main text are based on (survey) weighted data. For our multivariate analysis we rely on the unweighted data with demographic controls (based on current recommendations, see Limitations section below). This data collection is part of an ongoing larger multi-year project exploring narcissism and political and social behaviors in the US.

Protective Actions Against COVID-19

Our dependent measurements stem from a question block asking respondents about COVID-19 mask-wearing and vaccine behaviors and attitudes. Question wording and response proportions are described in Table 1.

The first three measures concentrate on mask-wearing but tap into different dimensions of these behaviors. The main

[1] There is also research on collective narcissism, which is focused on defensiveness about one's national identity and feeling about group *versus* an individual personality trait. Cislak et al. (2020) found this form of group narcissism was related to vaccination conspiracy beliefs.

difference between (1) and (2) is related to the subject of the activity, or the actor, with the second question inquiring about specific social expectations or expectations towards fellow residents. Notwithstanding, answers to these questions are highly aligned (polychoric correlation of 0.87), with only 11% off-diagonal: 20 respondents do not wear masks on a regular basis but expect others to do so, while 98 wear masks but do not expect others to do so. Overall, in both cases a high proportion of people are wearing masks on a regular basis (consistent with other nationally representative studies for the period of the data collection) and expecting others to do the same in public places.

Social encounters can generate situations where expectations do not meet the observed behavior and our third COVID-19 mask related item zooms in on such events. Those who expect others to wear a mask in public spaces were asked if they had told others to wear a mask, who weren't. Given the potential conflictual nature of such an encounter, only a fourth of the respondents ever did that.

Finally, with the availability of vaccines, public discussion shifted towards the willingness of being vaccinated, and thus we included a question asking respondents whether they will get vaccinated or not. Given the period of data collection, an additional answer category was also added, whether the respondent already received at least one dose of a COVID-19 vaccine. In total, around two thirds of our sample indicated a willingness to get vaccinated or prior vaccination against COVID-19.

Narcissism Measures

Grandiose narcissism is measured by twenty-five items from the NPI. Following the factor structure validated by Ackerman et al (2011), we compute an overall NPI score, and three subfacets: leadership/authority-seeking, grandiose exhibitionism, and entitlement/exploitativeness.[2] Ackerman et al.'s (2011) three-factor confirmatory model with no restrictions to the unweighted data fit well (DWLS estimator, robust: 0.899 (CFI), 0.889 (TFI), RMSEA of 0.049 (90% CI, 0.046, 0.052), and SRMR 0.09). In our analysis, for each individual, we calculate the sum of narcissistic answers for each subfacet and divide by the number of questions answered, resulting in a score for each subfacet and the full NPI (unweighted, all items) ranging from 0 to 1, with higher values reflecting more narcissism. The first part of Table 2 offers measurement related information and descriptive statistics. Reliability in general is high to acceptable, with entitlement/exploitativeness naturally scoring lowest on this measure. Overall, this US sample exhibits moderate narcissism levels, consistent with prior studies.

Table 2 Reliability and descriptive statistics for narcissism measures

	Items	Cronbach's alpha	Mean [0, 1] scale	SD
NPI (full)	25	0.82	0.29	0.18
Authority-seeking	11	0.74	0.39	0.25
Grandiose exhibitionism	10	0.75	0.23	0.22
Entitlement/exploitativeness	4	0.48	0.18	0.24
HSNS (full)	10	0.73	0.44	0.15
Egocentrism	4	0.63	0.36	0.19
Oversensitivity-to-judgement	6	0.69	0.50	0.18

Vulnerable narcissism is measured by the 10-item Hypersensitive Narcissism Scale (HSNS, see Hendin & Cheek 1997). Similar to the NPI, the original construction of the HSNS relied upon a single factor solution for the ten items, but as the measure developed, there is consensus that vulnerable narcissism has two facets, a self-centered/egocentric component and an oversensitivity-to-judgement or rejection-sensitivity component (Fossati et al., 2009; Stone & Bartholomay, 2020). Since there are subtle differences in the extant literature largely regarding item 9, we fitted confirmatory factor models (without cross-loadings) to mimic the proposed structure, together with a model influenced by an exploratory two-factor model on our data.

The differences in fit are marginal. However, the two-factor model by Fossait et al. (2009) fits our data the best[3]: 0.901 (CFI), 0.868 (TFI), RMSEA of 0.066 (90% CI, 0.058, 0.075), and SMRS 0.050. In prior two-factor models the item with potential cross-loadings has been Item 9 (*I dislike being with a group unless I know that I am appreciated by at least one of those present*). However, in our case Item 6 (*I feel that I am temperamentally different from most people*) has the weakest relationship to the oversensitivity-to-judgement factor. Given the wording and potential ambiguity on the direction of differences, this is not surprising, and the exclusion or differential treatment of Item 6 does not influence our results. For the HSNS, the response options are on

[2] We report detailed item list, measurement discussion, and factor analysis results in the Online Supplementary Information 1 (SI 1) for both narcissism measures. This includes an investigation of the structure of narcissism, including confirmatory models corroborating extant research finding that vulnerable and grandiose narcissism measures are distinct constructs (Brookes, 2015; Jauk et al., 2017; Kaufman et al., 2020; Lachowicz-Tabaczek et al., 2019; Miller et al., 2011; Miller et al., 2017).

[3] As with the three-factor NPI solution, we did not include any specific variance/covariance restrictions or cross-loadings, since the main aim of this paper is not a methodological contribution, and such work has been done elsewhere. Overall, we aim to offer a factor structure with good measurement properties and relatively straightforward interpretation.

Table 3 Between-measure correlations (Pearson's r)

	HSNS (full)	Egocentrism	Oversensitivity-to judgement
NPI (full)	0.027	**0.140**	-0.060
Authority-seeking	**-0.091**	0.001	**-0.130**
Grandiose exhibitionism	**0.067**	**0.144**	-0.006
Entitlement/exploitativeness	**0.238**	**0.344**	**0.097**

$p < 0.05$ significant entries bolded, unweighted data. NPI is the measure of grandiose narcissism; HSNS is the measure of vulnerable narcissism

5-point scale (from *very uncharacteristic* to *very characteristic*), thus we first linearly rescaled these to range from 0 (low narcissism) to 1 (high narcissism) and then calculated for everyone the simple averages across the items for each subfacet, or all items for the full HSNS scale, keeping a numerically comparable 0 to 1 range across narcissism measures.

Both the full HSNS and the subfacets show good reliability (see Table 2, second part) and it is also visible that vulnerable narcissism has a higher prevalence in comparison to narcissism measured through the NPI, with oversensitivity-to-judgement being present to the highest degree.

Table 3 highlights patterns very similar to those reported by previous studies: the two overall narcissism measures are essentially unrelated, with the expectation (Jauk et al., 2017) of moderate positive correlations for entitlement/exploitativeness with HSNS (specifically Self-centered/Egocentric) and weak positive relationship of Self-centered/Egocentrism with grandiose exhibitionism and with NPI. We also find a weak negative relationship between the more agentic authority-seeking subfacet and oversensitivity-to-judgement and HSNS, that has been reported elsewhere. These insights further emphasize not only the theoretical, but the empirical distinctiveness of grandiose and vulnerable narcissism and the multi-faceted nature of these traits, suggesting that the expected differences regarding social behaviors should be possible to identify, given that these measures tap into different aspects of personality.

Other Predictors and Control Variables

Our multiple regression analysis controls for several individual level covariates, including previously identified critical predictors of complying with COVID-19 protective policies. First and foremost, for each outcome, we include a covariate for how worried the individual is regarding COVID-19 (after the common prompt introduced in Table 1: *How worried are you about you or someone in your family being infected with COVID-19?*), with responses on a 5-point scale, ranging from not at all worried (0) to extremely worried (4) with a mean of 1.90 (SD = 1.29). This measure serves as a strong control for personal risk and perceived susceptibility to COVID-19. Prior research has shown that those who worry more about getting sick will be more likely to wear masks, expect other to wear masks and tell them so, and also get vaccinated.[4] Second, as the COVID-19 pandemic was heavily politicized, and political orientation appears among the stronger influences on COVID-19 related behaviors and beliefs, including information source, we include the individuals 7-point self-reported political party identifications (from Strong Democrat [0] to Strong Republican [6], Mean = 2.76, SD = 2.18). We also control for presence of mask mandate in the state where the respondent lives to capture the influence of legal ramifications and social sanction (1, 0 otherwise, with 66% of our respondents from living in a state with mask mandate at the time of data collection). Finally, we include socio-demographic controls for sex (1 for women, 51.3%), age in years (Mean = 48.66, SD = 18.09), race/ethnicity (1 for not Caucasian [36.8%], 0 otherwise), and education (from no high school [0] to postgrad [5], Mean = 2.39, SD = 1.51). Detailed demographic descriptive statistics are presented in SI 2.

Analysis and Results

We fit several models to assess the relationship between various forms of narcissism and COVID-19 related behaviors. Our four outcome variables (individual wearing a mask, expecting others to wear masks, told others to wear a mask [for those who believe others should wear a mask], will get vaccinated) are all dichotomous and thus we fit logistic regression models. For each outcome, we first report models that only include narcissism measures as predictors: a model with the full NPI25 measure (1), one including the three NPI subfacets (2), one with the full HSHS measure (3), and one with the two HSNS subfacets (4).[5]

Next, we extend these models by including all the additional predictors and controls along the narcissism measures. In order to facilitate interpretability and comparison between effects associated with variables measured on

[4] COVID-19 worry is essentially unrelated to our narcissism measures; except for Oversensitivity for Judgement, the bivariate correlations are not statistically significant. The strongest positive correlation is 0.088 with Oversensitivity for Judgement and the strongest negative -0.057 with leadership/authority-seeking.

[5] For ease of use, we opted for a visual summary of results by calculating the confidence intervals (essentially 1.96 times the standard error, plus and minus) using the estimated standard errors. All references to significance levels, however, are based on the p-values from the multiple regression models, which are reported in full in SI 3.

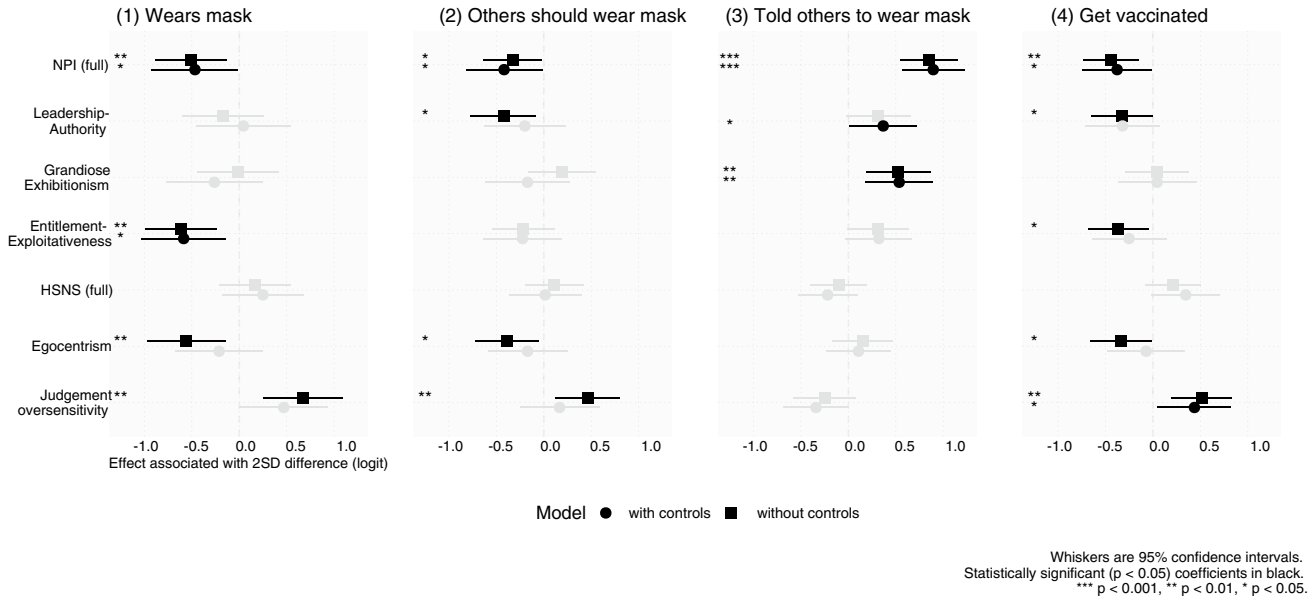

Fig. 1 Summary of regression results

different scales, we have rescaled all continuous predictors by subtracting their mean and dividing by two standard deviations, following recommendations from Gelman and Hill (2007). Thus, the effect sizes summarized in Fig. 1 and reported tabular format in SI3 are for a two standard deviation difference in the predictors or switching from 0 to 1 for dichotomous predictors.

Our results show that those scoring higher in overall grandiose narcissism were less likely to wear a mask in the context of the 2020/2021 regulations, and this is especially related to the entitlement/exploitativeness subfacet. For vulnerable narcissism, as expected, we see diverging subfacet relationships, where egocentrism is associated with lower likelihood of wearing a mask, whereas oversensitivity-to-judgement is associated with a higher likelihood of mask wearing. However, these relationships are only statistically significant ($p > 0.05$) in the bivariate models. When we look at expectations regarding whether others should wear a mask the results are very similar to those pertaining one's own mask wearing behavior. The authority-seeking subfacet of the NPI is influential, rather than entitlement/exploitativeness. Overall, we expected the same general patterns in this case as with individual mask wearing, but there are various potential intervening elements, depending on one's own mask wearing. To explore such a conditional relationship, we would need to fit multiple interaction models including both narcissism and own mask wearing as predictors of expectations from others. However, as mentioned beforehand, there is a very strong correlation (0.87) between the two mask wearing items with only 11% of the sample (118 respondents) in the off diagonal. This generates models close to linear separation and most variance is reduced by the inclusion of own mask wearing, with few observations in the data supporting the interaction.[6] As before, we also see that subfacets of vulnerable narcissism have diverging relationships with expecting others to wear a mask in the bivariate models ($p < 0.05$): those higher in oversensitivity-to-judgement are more likely to expect others to wear a mask, while those scoring high on egocentrism are less likely to expect others to wear a mask.

Intuitively, the agentic elements of the NPI and especially its authority-seeking and grandiose exhibitionism subfacets are influential whether one engages in potentially conflictual encounters of telling others how to behave. These pro-active, self-esteem, but also social potency related traits are necessary for such an interactive behavior, which also underlines that both adaptive and somewhat maladaptive (Ackerman et al., 2011) facets of narcissism play a role in regulating behavior of others in a desired manner.

Finally, for vaccination related outcomes we essentially find a combination of prior patterns: those higher in

[6] When exploring the average narcissism scores in the different combinations of these two variables, we find the highest grandiose narcissism scores (all subfacets and full NPI) were for those who do not wear masks but expect others to wear masks. This difference is quite large, for example 0.44 for NPI in this group in comparison to 0.28 for NPI in the group of wearing masks and expecting others to do the same. For vulnerable narcissism, there are no differences for the full scale or oversensitivity-to-judgment, but same patterns as for grandiose narcissism are found for egocentrism. However, we have only 20 individuals in the category that do not wear a mask, but expect others to do so.

grandiose narcissism (NPI) and especially authority-seeking and entitlement/exploitativeness are less likely to opt for vaccination, and this is also the case for those scoring higher in vulnerable narcissism's (HSNS) Self-centered/Egocentrism; however these relationships are not statistically significant once controls are included (they only reach $p < 0.10$). These findings are not overly surprising, once we think back to the between-measure correlations. In contrast, as expected, vulnerable narcissism's oversensitivity-to-judgement is positively related to preference for vaccination (either in the future or already in the past), and this relationship is significant even when including the most influential predictors.

Limitations

Certainly, none of our outcomes or any complex human behavior, have singular causes and no study can do it all. However, we include the most important known predictors of adhering to COVID protective policies, including political views, vaccination, and worry about COVID to address concerns of an underspecified model (e.g., there might be a third factor triggering both). Nevertheless, individual level traits aggregate differentially at substate levels and may create environmental influences that may have impacts on the outcomes. While we have individual level measures, our survey data does not allow for substate level aggregation. We do however, include state level mask mandates in our models and those serve as a meaningful proxy for many of the political and COVID-19 environmental conditions (Holtz et al., 2020; Lyu & Wehby, 2020). Perhaps more importantly, we account for COVID-19 worry and political orientation at the individual level, which serves as the most important (and potent) predictors of various attitudes and behaviors related to mask wearing and further interactions (Choma et al., 2021). While perceptions do not perfectly match reality, they are linked directly to the potential motivations and behavioral differences at the individual level, rather than more aggregated and distal measures at the county level for example. In this regard, while the sample is representative, it is only representative of the US, and therefore, the findings must be interpreted with this limitation.

As with all complex traits, they often can and do influence covariates. One strength of the current data is that is adds some insight toward explaining the case that when people perceive wearing masks or getting vaccinated as something that will help them, i.e., it is self-interest, and those higher in narcissism should and are more willing to do this. Our data show this to be the case but only through specific subdimensions. While we account for COVID-19 worry and this important predictor does not meaningfully correlate with narcissism, we cannot exclude potential moderation and mediation paths. One previously discussed limitation is explicitly conditioning on one's own mask-wearing behavior when modeling expectations from others. This step would enhance our ability to disentangle the role of self-interest but comes with substantial empirical and data-related limitations. In a similar vein, the second part of our analysis focuses on those who wear a mask and whether they asked others to follow suit. This allows us to see who is more willing to act on their own conviction and directly ask others to change their behaviors, but we do not know if the same would apply for those not wearing a mask, or how much of these interactions are motivated by self-interest or the need make sure people follow rules that are also shared by the individual.

In addition, we report multiple regression results in the main text based on models fitted to the unweighted data because of the diverging recommendations related to the inclusion of survey weights for (logistic) regression models, especially when the models include predictors that also feature in the weight calculation (Solon et al., 2015; Winship & Radbill, 1994). Nevertheless, when comparing the weighted and unweighted outcomes, we find only modest differences in the magnitude of the coefficient uncertainty estimated in some cases (see SI) and the main conclusions are broadly the same.

Finally, the nature of the analyses assumes a causal path, and we assess how between-individual variation in the personality traits is associated with different COVID-19 related behaviors. While it appears extremely unlikely that not wearing a mask (or how the questions were asked) should influence one's narcissism, we are not able to explicitly test such a reverse direction here, or to fully eliminate potential colliders or confounders in the causal graph connecting narcissism to COVID-19 related behaviors or preferences.

Discussion

Exploring the role of narcissism on engaging in protective policy against COVID, while accounting for the most important predictors, including the potent influence of political orientation, and concern about contracting or getting sick from COVID, our research has important theoretical and practical implications. First our results adjudicate between inconsistent findings on the relationship between narcissism and COVID-19 protective policies that relied on abbreviated measures or convenience samples, in particular those in the US. This large nationally representative study with well-validated more complete measures of both vulnerable and grandiose narcissism provides convincing results that narcissism in both its grandiose and vulnerable forms have a role on why people engage in protective polices to stop the spread of COVID-19.

Grandiose narcissism predicts less mask-wearing, and less vaccination. Higher entitlement and exploitativeness account for the majority of this relationship. This finding is consistent with decades of research finding that those higher in narcissism are more likely to exploit public goods and let others pay the costs for their benefit. However, if those higher in grandiose narcissism do wear a mask, then they are *more* likely to tell others to wear one as well. This may appear contradictory but makes sense once unpacking the subdimensions of grandiose narcissism: demand for mask-wearing for mask-wearers is a function of authority-seeking and exhibitionism. In this way, narcissism's influence depends on the individual and conditions; telling others to wear a mask fulfills authority-seeking demands, if one is a mask-wearer, and this demand appears to eclipse other narcissistic influences. In this situation, the desire to be seen as important and be followed appears to takes precedent. And higher exhibitionism is a necessary agentic component to engage in such interactive behavior.

The influence of vulnerable narcissism is also one of opposing forces. On the one hand, higher egocentrism predicted not wearing a mask, and not getting vaccinated. Caring only about the self intuitively predicts behaviors detrimental to the public. On the other hand, those higher in oversensitivity-to-judgement are more anxious about social sanction, and thus more likely to wear a mask and get vaccinated. This type of narcissism leads to greater adherence to protective policies.

These findings are generally robust in the face of powerful social forces. Few threats to a society are more pervasive than a pandemic. By demonstrating the role of narcissism in the context of political influence in the era of runaway polarization and misinformation, our results suggest that one's disposition remains important in social outcomes. From a practical perspective, this is both good and bad news. On the one hand, even if it were possible to reduce misinformation and polarization, those who are selfish and exploitative will still look for ways to benefit at others' costs. Still, there is a silver lining to be had. Activating authority-seeking (grandiose narcissism) and sensitivity-to-judgement (vulnerable narcissism) may offer some means to increase vaccination and protective policy compliance and even advertisement in groups that might not naturally comply. For example, those higher in authority-seeking, but who wear a mask, can become advocates for mask wearing, if they are inspired to do so themselves by reputational gain. Similarly, those sensitive-to-judgement can be more compliant if norms are created and they fear social sanction. Thus, the findings provide support that both incentivizing and public sanctioning programs can motivate those higher in narcissism. That is, at least for those higher on these traits, it appears possible to bend some forms of narcissism to work for the public good.

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Author Contributions Hatemi and Fazekas designed the study and created the survey. Fazekas analyzed the data. Both authors interpreted the data. Hatemi drafted the manuscript, and both authors provided critical revisions. Both authors approved the final version of the manuscript for submission.

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Declarations

Ethics All participants provided informed consent. All procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human subjects and with the Helsinki Declaration of 1968, as revised in 2008.

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