



Grandiose narcissism, unfounded beliefs, and behavioral reactions during the COVID-19 pandemic

Żemojtel-Piotrowska, Magdalena; Sawicki, Artur; Piotrowski, Jarosław; Lifshin, Uri; Kretchner, Mabelle; Skowronski, John J.; Sedikides, Constantine; Jonason, Peter K.; Adamovic, Mladen; Ahmed, Oli; Atitsogbe, Kokou A.; Al-Shawaf, Laith; Appiah, Seth Christopher Yaw; Ardi, Rahkman; Azam, Uzma; Babakr, Zana Hasan; Baldursson, Einar Baldvin; Bălăţescu, Sergiu; Bochaver, Konstantin; Bolatov, Aidos; Bonato, Mario; Bundhoo, Harshalini Y.; Chaleeraktragoon, Trawin; Chobthamkit, Phatthanakit; Cowden, Richard G.; Counted, Victor; de Clunie, Gisela; Dragova-Koleva, Sonya; Esteves, Carla Sofia; Gouveia, Valdiney V.; Gundolf, Katherine; Hamouda, Salima; Haretche, Carmen; Jeong, Evelyn Hye Kyung; Iliško, Dzintra; Malik, Najma Iqbal; Aruta, John Jamir Benzon; Jia, Fanli; Jovanović, Veljko; Jukić, Tomislav; Jukić, Doroteja Pavan; Kamble, Shanmukh V.; Khachatryan, Narine; Klicperova-Baker, Martina; Kogler, Christoph; Knezović, Emil; Koralov, Metodi; Kovacs, Monika; Eldesoki, Walaa Labib M.; Fernandez, Aitor Larzabal; Liik, Kadi; Malik, Sadia; Maltby, John; Malysheva, Karine; Mamuti, Agim; Mangafic, Jasmina; Moon, Chanki; Milfont, Taciano L.; Muehlbacher, Stephan; Najafi, Reza; Özsoy, Emrah; Park, Joonha; de León, Pablo Pérez; Solcova, Iva Polackova; Ramos-Diaz, Jano; Ridic, Goran; Riđić, Ognjen; Samekin, Adil; Spoto, Andrea; Starc, Andrej; Stefenel, Delia; Trã, Kiêu Thị Thanh; Tiliouine, Habib; Tomšik, Robert; Torres-Marín, Jorge; Umeh, Charles S.; Wills-Herrera, Eduardo; Włodarczyk, Anna; Vally, Zahir; Vauclair, Christin-Melanie; Yahiaiev, Illia; Zand, Somayeh

Published in:
Scientific Reports

DOI (link to publication from Publisher):
[10.1038/s41598-024-67954-2](https://doi.org/10.1038/s41598-024-67954-2)

Creative Commons License
CC BY 4.0

Publication date:
2024

Document Version
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Żemojtel-Piotrowska, M., Sawicki, A., Piotrowski, J., Lifshin, U., Kretchner, M., Skowronski, J. J., Sedikides, C., Jonason, P. K., Adamovic, M., Ahmed, O., Atitsogbe, K. A., Al-Shawaf, L., Appiah, S. C. Y., Ardi, R., Azam, U., Babakr, Z. H., Baldursson, E. B., Bălăţescu, S., Bochaver, K., ... Zand, S. (2024). Grandiose narcissism, unfounded beliefs, and behavioral reactions during the COVID-19 pandemic. *Scientific Reports*, 14(1), Article 17503. <https://doi.org/10.1038/s41598-024-67954-2>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from vbn.aau.dk on: February 07, 2025



OPEN

Grandiose narcissism, unfounded beliefs, and behavioral reactions during the COVID-19 pandemic

Magdalena Żemojtel-Piotrowska^{1✉}, Artur Sawicki², Jarosław Piotrowski¹, Uri Lifshin³, Mabelle Kretchner⁴, John J. Skowronski⁵, Constantine Sedikides⁶, Peter K. Jonason^{1,7}, Mladen Adamovic⁸, Oli Ahmed⁹, Kokou A. Atitsogbe¹⁰, Laith Al-Shawaf¹¹, Seth Christopher Yaw Appiah¹², Rahkman Ardi¹³, Uzma Azam¹⁴, Zana Hasan Babakr¹⁵, Einar Baldvin Baldursson¹⁶, Sergiu Bălăţescu¹⁷, Konstantin Bochner¹⁸, Aidos Bolatov¹⁹, Mario Bonato²⁰, Harshalini Y. Bundhoo²¹, Trawin Chaleeraktragoon²², Phatthanakit Chobthamkit²², Richard G. Cowden²³, Victor Counted²⁴, Gisela de Clunie²⁵, Sonya Dragova-Koleva²⁶, Carla Sofia Esteves²⁷, Valdiney V. Gouveia²⁸, Katherine Gundolf²⁹,

¹Cardinal Stefan Wyszyński University in Warsaw, Wóycickiego 1/3, 01-938 Warsaw, Poland. ²University of Gdansk, Gdańsk, Poland. ³Reichman University, Herzliya, Israel. ⁴Interdisciplinary Center (IDC), Herzliya, Israel. ⁵Northern Illinois University, DeKalb, USA. ⁶University of Southampton, Southampton, UK. ⁷Padova University, Padova, Italy. ⁸King's College London, London, UK. ⁹University of Chittagong, Chittagong, Bangladesh. ¹⁰University of Lausanne, Lausanne, Switzerland. ¹¹University of Colorado, Colorado Springs, USA. ¹²Department of Sociology and Social Work, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. ¹³Universitas Airlangga, Surabaya, Indonesia. ¹⁴Aligarh Muslim University, Aligarh, India. ¹⁵Soran University, Soran, Iraq. ¹⁶Aalborg University, Aalborg, Denmark. ¹⁷University of Oradea, Oradea, Romania. ¹⁸Independent Researcher, Dubna, Russia. ¹⁹Astana Medical University, Astana, Kazakhstan. ²⁰University of Padova, Padova, Italy. ²¹University of Mauritius, Reduit, Moka, Mauritius. ²²Thammasat University, Pathumthani, Thailand. ²³Harvard University, Boston, MA, USA. ²⁴Regent University, Virginia Beach, VA, USA. ²⁵Universidad Tecnológica de Panamá, Panama City, Panama. ²⁶New Bulgarian University, Sofia, Bulgaria. ²⁷Católica Lisbon Research Unit in Business and Economics, Católica Lisbon School of Business and Economics, Universidade Católica Portuguesa, Lisboa, Portugal. ²⁸Federal University of Paraíba, Paraíba, Brazil. ²⁹University of Applied Sciences Upper Austria, Wels, Austria. ³⁰University of Biskra, Biskra, Algeria. ³¹Instituto Nacional de Evaluación Educativa, Montevideo, Uruguay. ³²University of Limerick, Limerick, Ireland. ³³Daugavpils University, Daugavpils, Latvia. ³⁴University of Sargodha, Sargodha, Pakistan. ³⁵De La Salle University, Manila, Philippines. ³⁶Seton Hall University, South Orange, NJ, USA. ³⁷University of Novi Sad, Novi Sad, Serbia. ³⁸Josip Juraj Strossmayer University, Osijek, Croatia. ³⁹School of Medicine, University of Zagreb, Zagreb, Croatia. ⁴⁰Karnatak University, Dharwad, Karnataka, India. ⁴¹Yerevan State University, Yerevan, Armenia. ⁴²Czech Academy of Sciences, Praha, Czech Republic. ⁴³Tilburg University, Tilburg, The Netherlands. ⁴⁴International University of Sarajevo, Sarajevo, Bosnia and Herzegovina. ⁴⁵New Bulgarian University, Sofia, Bulgaria. ⁴⁶ELTE Eötvös Loránd University, Budapest, Hungary. ⁴⁷Department of Education and Psychology, Faculty of Science and Arts in Qurayyat, Al Jouf University, Sakaka, Saudi Arabia. ⁴⁸Department of Psychology, Faculty of Arts, Menoufia University, Shebin El-Kom, Egypt. ⁴⁹Universidad del País Vasco (UPV/EHU), Leioa, Spain. ⁵⁰Tallinn University, Tallinn, Estonia. ⁵¹University of Leicester, Leicester, UK. ⁵²Taras Shevchenko National University of Kyiv, Kyiv, Ukraine. ⁵³Mother Theresa University, Tirana, Albania. ⁵⁴University of Sarajevo, Sarajevo, Bosnia and Herzegovina. ⁵⁵Royal Holloway, University of London, Egham, UK. ⁵⁶University of Waikato, Tauranga, New Zealand. ⁵⁷Department of Psychology and Psychodynamics, Division of Work, Organizational, and Economic Psychology, Karl Landsteiner University of Health Sciences, Krems, Austria. ⁵⁸University of Padova, Padova, Italy. ⁵⁹Sakarya University, Serdivan, Turkey. ⁶⁰Graduate School of Education, Kyoto University, Kyoto, Japan. ⁶¹Universidad Católica del Uruguay, Montevideo, Uruguay. ⁶²Facultad de Ciencias de La Salud, Universidad Privada del Norte, Lima, Peru. ⁶³SRH Mobile University, Riedlingen, Germany. ⁶⁴M. Narikbayev KAZGUU University, Astana, Kazakhstan. ⁶⁵University of Ljubljana, Ljubljana, Slovenia. ⁶⁶Lucian Blaga University of Sibiu, Sibiu, Romania. ⁶⁷Ho Chi Minh City University of Education, Ho Chi Minh City, Vietnam. ⁶⁸University of Oran2 Mohamed Ben Ahmed, Belgaid, Oran, Algeria. ⁶⁹Research Institute for Child Psychology and Pathopsychology, Bratislava, Slovakia. ⁷⁰Department of Research Methods in Behavioral Sciences, University of Granada, Granada, Spain. ⁷¹College of Medicine, University of Lagos, Lagos, Nigeria. ⁷²Los Andes University, Bogotá, Colombia. ⁷³Universidad Católica del Norte, Antofagasta, Chile. ⁷⁴United Arab Emirates University, Al Ain, United Arab Emirates. ⁷⁵Instituto Universitário de Lisboa (ISCTE-IUL), CIS-IUL, Lisboa, Portugal. ⁷⁶University of Milano-Bicocca, Milan, Italy. ✉email: m.zemojtel-piotrowska@uksw.edu.pl

Salima Hamouda³⁰, Carmen Haretche³¹, Evelyn Hye Kyung Jeong³², Dzintra Iliško³³, Najma Iqbal Malik³⁴, John Jamir Benzon Aruta³⁵, Fanli Jia³⁶, Veljko Jovanović³⁷, Tomislav Jukić³⁸, Doroteja Pavan Jukić³⁹, Shanmukh V. Kamble⁴⁰, Narine Khachatryan⁴¹, Martina Klicperova-Baker⁴², Christoph Kogler⁴³, Emil Knezović⁴⁴, Metodi Koralov⁴⁵, Monika Kovacs⁴⁶, Walaa Labib M. Eldesoki^{47,48}, Aitor Larzabal Fernandez⁴⁹, Kadi Liik⁵⁰, Sadia Malik³⁴, John Maltby⁵¹, Karine Malysheva⁵², Agim Mamuti⁵³, Jasmina Mangafic⁵⁴, Chanki Moon⁵⁵, Taciano L. Milfont⁵⁶, Stephan Muehlbacher⁵⁷, Reza Najafi⁵⁸, Emrah Özsoy⁵⁹, Joonha Park⁶⁰, Pablo Pérez de León⁶¹, Iva Polackova Solcova⁴², Jano Ramos-Diaz⁶², Goran Ridic⁶³, Ognjen Ridić⁴⁴, Adil Samekin⁶⁴, Andrea Spoto²⁰, Andrej Starc⁶⁵, Delia Stefanel⁶⁶, Kiều Thị Thanh Trà⁶⁷, Habib Tiliouine⁶⁸, Robert Tomšik⁶⁹, Jorge Torres-Marín⁷⁰, Charles S. Umeh⁷¹, Eduardo Wills-Herrera⁷², Anna Włodarczyk⁷³, Zahir Vally⁷⁴, Christin-Melanie Vauclair⁷⁵, Illia Yahiaiev⁵² & Somayeh Zand⁷⁶

A theoretical perspective on grandiose narcissism suggests four forms of it (sanctity, admiration, heroism, rivalry) and states that these forms conduce to different ways of thinking and acting. Guided by this perspective, we examined in a multinational and multicultural study (61 countries; $N = 15,039$) how narcissism forms are linked to cognitions and behaviors prompted by the COVID-19 pandemic. As expected, differences in cognitions and behaviors across narcissism forms emerged. For example, higher narcissistic rivalry predicted lower likelihood of enactment of COVID-19 prevention behaviors, but higher narcissistic sanctity predicted higher likelihood of enactment of COVID-19 prevention behaviors. Further, whereas the heroism, admiration, and rivalry narcissism forms acted in a typically antisocial manner, with high narcissism predicting greater endorsement of unfounded health beliefs, the sanctity form acted in a prosocial manner, with higher narcissism being linked to lower endorsement of unfounded COVID-19 health beliefs. Thus, the findings (a) support the idea of four narcissism forms acting differently, and (b) show that these differences reflect a double-edged sword, sometimes linking to an anti-social orientation, and sometimes linking to a pro-social orientation.

Research into the COVID-19 pandemic explored, in part, links between psychosocial functioning and responses to it^{1–3}. One stream of this research focused on grandiose narcissism^{4–6}, characterized by self-absorbing self-aggrandizement^{5,6}, distinctly from vulnerable narcissism that is characterized by feelings of inadequacy and incompetence^{5–7}. In the context of the pandemic, which required a socially coordinated and collective response to combat the crisis effectively, this focus makes sense. Given that (grandiose) narcissists are often seen as self-serving, ostentatious, and exploitative^{6,8}, they might not be especially helpful in responding to collective crises like the pandemic. Indeed, the early narcissism literature in the context of the pandemic examined associations between grandiose narcissism and various anti-social variables, such as (a) failing to respect national restrictions, (b) selfish behavior (e.g., hoarding), and (c) the adoption of unfounded beliefs about the pandemic (e.g., Coronavirus was created to be a bioweapon).

The pertinent findings have been informative, but somewhat limited. First, grandiose narcissism was often treated as a primarily agentic construct^{4,5,9,10}, although some research also addressed communal narcissism^{11,12}. As suggested by recent theorizing, this view of narcissism may be too restrictive⁶. Second, the emphasis was on the association between narcissism and undesirable thoughts and behaviors, largely neglecting the potential link between narcissism and desirable thoughts and behaviors such as helping, with notable exceptions^{11,13,14}. We aim to address these limitations by exploring the relation between grandiose narcissism and psychosocial functioning via (a) a fourfold model, and (b) assessments of both negative and positive elements of psychosocial functioning likely to be influenced by the pandemic. When we use the term “narcissism,” we imply grandiose narcissism.

Forms of Grandiose Narcissism

Grandiose narcissists strive to maintain an inflated self-view in domains central or important to them^{15,16}. These domains can be agentic (involving such attributes as competition, achievement, and effectiveness) or communal (involving such attributes as cooperation, morality, and kindness¹⁷). Grandiose narcissism, then, can comprise two forms: agentic and communal^{18,19}. Supporting this distinction are findings indicating that agentic narcissists and communal narcissists evince distinct beliefs and behaviors⁶. Specifically, communal (but not agentic) narcissists report that they are more prosocial^{10,15}, more trustworthy²⁰, and less likely to obey immoral authority¹⁴, while overestimating their knowledge on communal topics¹⁵.

However, each of these two forms of grandiose narcissism can be subdivided further based on the motive, self-enhancement or self-protection, driving the narcissism^{5,21}. This motivational distinction leads to the proposal that there are two forms of *agentic* narcissism: admiration and rivalry²². Admirative narcissists are thought to be guided by the self-enhancement motive^{23,24} to gain an ego boost by seeing themselves as highly agentic or effective (e.g., that they are exceptionally mentally stable or a genius). In comparison, rivalrous narcissists are thought to be guided by the self-protection motive^{16,25} to gain an ego boost by denigrating others' agency or effectiveness (asserting that others are especially mentally unstable or especially stupid). Further, this motivation distinction leads to the proposal that there are two forms of *communal* narcissism: sanctity and heroism²⁶. Narcissistic sanctity produces an ego boost by thinking of oneself as especially moral or saintly, or by acting in these ways, and is thought to be driven by the self-enhancement motive. In comparison, narcissistic heroism produces an

ego boost by inducing positive crisis-related thoughts (e.g., only I alone can save us) or actions (developing novel technology to fight climate change), and is thought to be driven by the self-protection motive.

This fourfold model is of interest because it potentially contradicts the standard view of narcissists as acting to the detriment of others. Instead, a communal narcissist can augment their perceived grandiosity via their helping-related actions and thoughts^{26–28}. The fourfold model suggests that sometimes helping-related actions and thoughts^{4,28,29} are driven by self-enhancement (e.g., “all the people I helped worship me and say they love me and admire me—I’m great!”). However, there are other prosocial routes to boosting a narcissist’s ego. For example, sometimes a narcissist’s grandiosity might be augmented by the mere thought that only the heroic, self-protecting, narcissist has the power to eliminate a collective’s troubles (e.g., “We are all going to be doomed unless you let me fix this!”), and the narcissist may act accordingly.

Fourfold grandiose narcissism and variation in responses to the COVID-19 pandemic

The implication of the fourfold model of grandiose narcissism, then, is that there are different motives that underlie narcissism (self-enhancement vs. self-protection) and distinct domains in which narcissism can be expressed (agentic vs. communal). This view implies that forms of narcissists may think and behave differently, and for varying reasons. We sought evidence for these possibilities in the context of the pandemic.

We used existing instruments to measure the extent to which individuals evinced each of the four narcissism forms (admiration, rivalry, sanctity, heroism). In addition, to replicate and extend results from prior COVID-19 psychosocial research^{30,31}, we assessed the extent to which individuals endorsed unfounded beliefs about the pandemic. Some of these were conspiracy beliefs (e.g., “Coronavirus was created to be a bioweapon”) and some were health beliefs (e.g., “Eating garlic cures the coronavirus”). We also pursued our replication and extension goal by building on COVID-19 psychosocial research that examined behaviors³². As in that research, we assessed the extent to which individuals engaged in three types of behavioral responses to the pandemic: prevention (e.g., “more frequent washing hands”), hoarding (e.g., “buying food products, like rice, flour, milk, canned goods, rice”), and helping (e.g., “provide emotional help those in need”).

We explored (a) the extent to which the narcissism forms independently predicted thoughts or behaviors, (b) whether these predictive effects varied across narcissism forms, and (c) whether any lack of independence reflected commonality either in underlying motive (self-enhancement vs. self-protection) or domain (agentic vs. communal). The fourfold model would be supported by results showing that (a) any of the four narcissism forms uniquely predict thoughts or behaviors, (b) the four narcissism forms predict thoughts and behaviors differently (e.g., one form might positively predict a thought/behavior, whereas another form might negatively predict the same thought/behavior), and (c) the observed patterns make sense in terms of the dimensions of the fourfold model (self-enhancement vs. self-protection, agentic vs. communal).

What result patterns would be consistent with the fourfold model? One such pattern might show that, though all forms of heightened narcissism are positively related to unfounded beliefs of COVID-19 being the consequence of conspiracy, this positive relation is stronger for narcissism’s self-protection (rivalry, heroism) than self-enhancement (admiration, sanctity) forms. This hypothesis relies on the idea that threat to the self prompts explanatory behavior deflecting the threat away from the self^{16,25}, but this tendency will be pronounced in narcissists who are particularly responsive to self-threat, regardless of domain. Another possible pattern of results might show that both narcissism forms in the communal domain (sanctity, heroism) positively predict the extent to which an individual provides emotional COVID-related support to others, but that narcissism forms in the agentic domain (admiration, rivalry) negatively predict such behavior. This hypothesis is grounded in the idea that a narcissist can be prosocial (e.g., help others) to boost the self via social approval for one’s prosocial-actions, regardless of whether those actions result from the motive to promote the self (e.g., appearing saintly) or protect the self (e.g., avoid appearing indifferent). We note that our hypotheses for the agentic domain derive from the notion that agentic narcissists get their ego boost from the extent to which they are perceived to be effective; as such, unless effectiveness information can be derived from a thought or behavior, agentic narcissists will be highly unlikely to engage in, or endorse, behaviors such as providing emotional support to others.

These findings, should they occur, will have implications for the literature on narcissism and responses to the pandemic. Specifically, the conclusions from that literature, which generally treated narcissism as a unitary construct, will need to be revised if the narcissism forms predict outcomes independently or differently. They will also need to be revised if narcissism sometimes promotes pro-social thoughts and behaviors.

Methods

Participants

We used data collected, via convenience sampling, between 24 April and 20 November 2020. The data were collected as part of the international (and preregistered at OSF) project, “COVID-19, personality and quality of life: Self-enhancement in the time of pandemic.” Other studies have also relied on this dataset^{30,33,34}.

The project obtained ethical approval from the Bioethics board of Cardinal Stefan Wyszyński University in Warsaw [KEiB – 32/2020]. Each participant provided informed consent prior to participation. All methods were carried out in accordance with relevant guidelines and regulations.

Participants were invited to engage in the study via email or an announcement on Facebook forums devoted to COVID-related topics. These communications included a link to the project’s website. After accessing the website, participants reported their nationality and country of residence, and selected their preferred language version (out of 35 language options). [We distributed invitations and announcements in official languages. Most participants in each country ($M = 96.17\%$, $SD = 6.46\%$) selected the country’s official language (e.g., Italians selected Italian). Latvians were the exception: Only 64.90% of them selected Latvian]. We did not offer remuneration, except for participants from the Republic of South Africa and the United Kingdom (2GBP or

≈2.5USD). [We lacked funding for data collection, and so we did not pay participants in general. However, in these two countries, we encountered insurmountable difficulties with data collection. We managed to carry out the surveys after local collaborators secured funding from their home institutions].

For a country's data to be included in the sample, the country needed to provide at least 40 usable participants³⁴. After exclusions, the final sample included data from 61 countries. We report each country's sample composition in Supplementary Information, Table S1.

With one exception, we deemed data usable if participants (a) were over the age of 18 years, (b) responded to all scales, and (c) passed all three randomly placed attention-check items (e.g., "This item aims to check your attention. Please mark 2"). The exception involved gender. We did not include in the analyses data from 90 (0.6%) non-binary individuals because gender was a predictor in our analyses, and we deemed the sample size of the non-binary individual group too small and too unbalanced across countries to yield trustworthy results.

The final sample comprised 15,093 participants (65.7% women, 34.3% men) aged between 18 and 87 years ($M = 31.7$, $SD = 12.3$). Of them, 0.80% had a primary education level, 30.53% a secondary education level, 38.97% a bachelor's level, 23.32% a master's level, and 6.39% a doctoral level or higher.

Measures

Narcissism Predictors

We assessed four forms of grandiose narcissism: admiration, rivalry, sanctity, heroism. We assessed admiration and rivalry using the 6-item shortened version of the Narcissistic Admiration and Rivalry Questionnaire²². Three items pertain to admiration (e.g., "I deserve to be seen as a great personality") and three to rivalry (e.g., "I want my rivals to fail"). We assessed sanctity and heroism with the 10-item Narcissistic Sanctity and Heroism Questionnaire²⁶. Five items pertain to sanctity (e.g., "I can understand everyone in every situation") and three to heroism (e.g., "There is no one except me who can deal with threats to my surroundings"). All response options ranged from 1 (*strongly disagree*) to 6 (*strongly agree*).

Criterion variables

We were interested in the extent to which the measures of narcissism predicted both thoughts about COVID-19 and behaviors related to COVID-19. To replicate and extend prior research, we focused on unfounded beliefs about the coronavirus in our assessment of thoughts. We measured them with the Unfounded Beliefs of COVID-19 Misperceptions Scale^{30,31}. Four items refer to conspiratorial beliefs (e.g., "A cure for the coronavirus has already been discovered but is being suppressed by people who want the pandemic to continue") and four to health beliefs (e.g., "If one gargles with warm water and salt or vinegar it eliminates the coronavirus"). Response options ranged from 1 (*strongly disagree*) to 7 (*strongly agree*).

Our interest in replication and extension also drove the behavior assessments that we used. In particular, we adapted previously used three types of behavioral responses to the pandemic³²: prevention (e.g., "more frequent washing hands"), hoarding (e.g., "buying food products, like rice, flour, milk, canned goods, rice"), helping (e.g., "provide emotional help those in need"). We assessed each of them with three items. Participants indicated the extent (1 = *definitely not*, 4 = *definitely yes*) to which they enacted each behavior in the week preceding data collection.

All measures were translated by local teams using a standard back-translation procedure³⁵. Each participant received (a) a version of the measures that matched their preferred language, and (b) the measures in a separate random. We report descriptive statistics for all measures in all countries in Supplementary Information, Table S2. With two exceptions, the scales' internal consistency (Cronbach's α) was adequate or better in all countries and for all variables. The exceptions were for the measures of rivalry and helping behaviors, which evinced an average Cronbach's α of 0.57 in both cases. We report coefficients across countries in Supplementary Information, Table S3.

Data-analytic strategy

We conducted an initial wave of analyses that focused on describing the sample characteristics and calculated the simple correlations among variables. However, given the nested structure of the data, we recognized that we needed to go beyond such simple descriptors to test our hypotheses, especially the extent to which each of the four narcissism forms evinced predictive power that was independent of the other forms. In pursuit of this goal, we carried out a set of Multilevel Models (MLM), which simultaneously included all the forms of narcissism that we had studied.

Acknowledging that at least a metric level of measurement invariance is necessary for the predictiveness of the narcissism measures to be valid, we first assessed whether the responses to the narcissism assessments and to unfounded belief items were comparable across countries. We did not include the measures of behavioral responses in this analysis step because the behavior items were not part of a response scale with known psychometric properties and, thus, were not suited for our analytic approach.

To examine whether responses to the narcissism and belief measures provided structurally valid data across countries, we first conducted Confirmatory Factor Analyses (CFAs) across all countries, when possible ($n > 100$, 50 countries). Second, we conducted Multigroup Confirmatory Factor Analyses, allowing for partial metric invariance, and excluded items in some cases (for details, see Supplementary Information, Factor Analyses of Used Instruments section). Third, we estimated latent variable scores for each participant using CFA on the whole sample (61 countries).

To test whether the four narcissism forms independently predicted unfounded COVID-19 beliefs and COVID-19 related behavior, we relied on a series of Multilevel Models (MLM). We report results from the models in Supplementary Information, Tables S5–S9. As depicted in those tables, the analyses proceeded hierarchically.

We added sequentially each predictor or group of predictors to help highlight the shared effects of the predictors and the unique effects of each predictor. In the first step of each model and for each criterion variable, we entered control variables such as the age, gender, and economic status of participants. In the second step of each model, we included admiration and rivalry in one common analysis (2A) and sanctity and heroism in a second common analysis (2B) to control for their common effects and to examine their residual effects within each dimension of the fourfold model (i.e., agency vs. communion, self-enhancement vs. self-protection). Finally, in the third step, we entered all four narcissism forms as simultaneous predictors to examine their incremental predictive effects.

In all analyses, we used R software with the “dplyr” package for basic data analyses, the “lavaan” package for factor analyses, and the “lme4” package for MLM analyses. In the factor analyses, we used the Robust Maximum Likelihood (MLR) estimator to account for deviations from normality³⁶ and relied on the following thresholds of fit: CFI > 0.90, RMSEA < 0.08, SRMR < 0.08^{37,38}. In the cross-national Multigroup Confirmatory Factor Analyses, we relied on the thresholds: $\Delta\text{CFI} < -0.02$, $\Delta\text{RMSEA} < 0.03$ ³⁹. To compare coefficients, we relied on 95% confidence intervals of standardized effects. We interpreted overlapping CIs as indicative of no significant difference between the compared coefficients.

Results

Preliminary analyses

We provided the zero-order correlations among variables for the whole sample (i.e., ignoring the data’s nested structure) in Supplementary Information, Table S4. With one exception (rivalry did not predict prevention behavior), all narcissism forms significantly and positively predicted all criterion variables.

These significant correlations present a mixed picture with regard to whether narcissists can be pro-social or anti-social. The simple correlations suggest that narcissists are likely to endorse both unfounded conspiracy beliefs and unfounded health beliefs about COVID-19 and are more likely to engage in hoarding behavior. However, these correlations also suggest that narcissists are more likely to engage in COVID-19 prevention behavior and to provide COVID-19 related emotional support to others.

The initial suggestion that high narcissism may conduce to pro-sociality is controversial. However, these simple correlations may be misleading. For example, if the narcissism form predictors are correlated with each other (and they are: see Supplementary Information, Table S4), the correlation between any given narcissism form predictor and a criterion variable might be contaminated by the other narcissism forms. Consequently, we engaged in analyses that allow assessment of the extent to which a narcissism form predicts beliefs and behaviors in a manner that is uncontaminated by, or independent of, other narcissism forms. The Multilevel Modeling Analyses, summarized in the section that follows (and fully presented in Supplementary Information, Tables S5–S9), accomplish that goal. These analyses probe the extent to which the predictive effects of each narcissism form are independent, controlling for other potential confounds such as between-country effects (accounted for via the ICC term in the models) and participant characteristics (e.g., gender).

Narcissism and unfounded beliefs about the coronavirus

Unfounded conspiracy beliefs

Results from the MLM analyses conducted on the unfounded conspiracy beliefs showed that all narcissism forms were positively related to conspiracy beliefs (for a summary, see Table 1; for full results, see Supplementary Information, Table S5). However, the results also indicated that the narcissism-unfounded belief endorsement association was significant and independent only for narcissism’s self-protection forms (i.e., rivalry, heroism) and not its self-enhancement ones (i.e., admiration, sanctity). The 95% CIs of the standardized coefficients were [0.07, 0.12] for rivalry, [– 0.02, 0.04] for admiration, [0.10, 0.16] for heroism, and [0.00, 0.06] for sanctity.

These results point to several conclusions. First, not all narcissism forms are equal. Instead, they are differentially linked to the unfounded conspiracy belief criterion variable: some independently predict the endorsement of unfounded conspiracy beliefs but others do not. Second, narcissistic thoughts can be motivated by either self-enhancement or self-protection. In this case, it was only the self-protective narcissism forms (rivalry and heroism) that independently predicted the endorsement of unfounded conspiracy beliefs.

Unfounded health beliefs

Results from the MLM analyses conducted on the unfounded health beliefs showed that all narcissism forms were significantly related to unfounded health beliefs (for a summary, see Table 1; for full results, see Supplementary Information, Table S6). However, the direction of this relation differed across forms. Heroism (95% CI = [0.13, 0.19]), admiration (95% CI = [0.01, 0.07]), and rivalry (95% CI = [0.03, 0.08]) all positively and independently predicted endorsement of unfounded health beliefs, but sanctity [– 0.06, 0.00] negatively and independently predicted endorsement of such beliefs.

These results allude to the same two conclusions as above. Narcissism forms are differentially associated with the unfounded health belief. In this case, although the heroism, admiration, and rivalry forms act in a typically antisocial manner, with high narcissism predicting greater endorsement of unfounded health beliefs, the sanctity acts in a prosocial manner, with higher narcissism being linked to lower endorsement of unfounded COVID-19 health beliefs.

Narcissism and behavioral responses to the pandemic

Enactment of prevention behaviors

Results from the MLM analyses conducted on the likelihood of an individual enacting COVID-19 prevention behaviors in the past week (for a summary, see Table 1; for full results, see Supplementary Information, Table S7) indicated that the criterion variable was predicted only by rivalry (95% CI = [– 0.06, – 0.01]) and sanctity (95%

	Unfounded beliefs		Behavioral responses		
	Conspiracy	Health	Prevention	Hoarding	Prosocialness
Fixed Effects					
Covariates					
Sex (men)	– .03	.00	– .19**	– .02	– .04*
Age	– .03**	.05**	.02*	.01	.11**
Education level	– .12**	– .07**	.03**	.00	.02
SES	– .07**	– .04**	.02*	.02**	.01
GDP	– .26**	– .32**	– .14*	– .14**	– .15**
Narcissism forms					
Admiration	.01	.04*	.00	.01	.07**
Rivalry	.09**	.06**	– .04*	.02	– .08**
Sanctity	.03	– .03*	.07**	.02	.13**
Heroism	.13**	.16**	.03	.09**	.11**
Random effects					
ICC	.11	.17	.27	.11	.08
Country: intercept	0.13	0.19	0.14	0.08	0.04
Residual	1.02	0.94	0.36	0.65	0.05
Marginal R ²	.18	.19	.04	.05	.11
Conditional R ²	.27	.33	.30	.15	.18

Table 1. Standardized coefficients of multilevel models—unfounded beliefs about COVID-19. $N = 15,039$; Number of countries = 61; SES = socioeconomic status; GDP = Gross Domestic Product per capita. Significant links are bolded. * $p < .05$. ** $p < .01$.

CI = [0.04, 0.10]), and not by heroism (95% CI = [0.00, 0.06]) or admiration (95% CI = [– 0.02, 0.03]). Notably, the direction of the predictive relation differed for rivalry and sanctity: Higher narcissistic rivalry predicted a lower likelihood of enactment of COVID-19 prevention behaviors, but higher narcissistic sanctity predicted a higher likelihood of enactment of COVID-19 prevention behaviors.

Therefore, when narcissism does predict the enactment of prevention behaviors, the direction of that relation differs across forms. Whereas rivalrous narcissists behaved in the anti-social manner (i.e., higher narcissism predicted lower enactment likelihood), sanctimonious narcissists behaved in a prosocial manner (i.e., higher narcissism predicted greater enactment likelihood).

Hoarding

Results from the MLM analyses conducted on the extent to which an individual enacted COVID-19-related hoarding behaviors (for a summary, see Table 1; for full results, see Supplementary Information, Table S8) revealed that hoarding was significantly and independently predicted by only one form of narcissism: heroism (95% CI = [0.06, 0.12]; for sanctity, 95% CI = [– 0.02, 0.05]; for admiration, 95% CI = [– 0.02, 0.04]; and for rivalry 95% CI = [0.00, 0.05]).

Helping via provision of emotional support

Results from the MLM analyses conducted on the extent to which an individual enacted COVID-19-related behaviors that involved providing emotional support to others (for a summary, see Table 1; for full results, see Supplementary Information, Table S9) revealed that all narcissism forms were significantly and independently linked to helping. However, these effects were not all in the same direction. The predictive effects were positive for sanctity (95% CI = [0.10, 0.16]), heroism (95% CI = [0.08, 0.14]), and admiration (95% CI = [0.04, 0.10]), but negative for rivalry (95% CI = [– 0.11, – 0.05]). Perhaps surprisingly, three of these independent and significant effects indicate that high (sanctity, heroism, admiration) narcissism predicted greater rates of pro-social behavior. Only heightened rivalrous narcissism yielded the pattern that would be considered to be typical of narcissism, with high rivalrous narcissism predicting lower rates of emotional support behavior. Hence, across all analyses, we found that not all forms of narcissism are equal, as they are differentially related to the probability of enacting COVID-related behaviors. This mirrors results found for COVID-related thoughts, supporting hypotheses derived from the fourfold model.

Discussion

We examined whether (a) each grandiose narcissism form (sanctity, heroism, admiration, rivalry) predicted unfounded beliefs about COVID-19 and some COVID-19-linked behaviors; (b) these predictive effects varied across forms; and (c) any lack of independence among the forms reflected commonality in either domain (agentic vs. communal) or underlying motive (self-enhancement vs. self-protection) linked to the four forms. We expected results showing that (a) forms uniquely predicted beliefs or actions, (b) forms predicted beliefs and behaviors

differently, and (c) the patterns observed in the relations make sense in terms of the dimensions of the fourfold model (self-enhancement vs. self-protection, agentic vs. communal) thought to produce the four forms.

The results indicated that the fourfold model is valid in that it possesses predictive utility. In two cases (unfounded health beliefs and the provision of emotional support), all four narcissism forms independently predicted each criterion variable. In two other cases (endorsement of conspiracy beliefs and enactment of prevention behavior), two narcissism forms significantly and independently predicted each criterion variable. In the final case (enactment of hoarding behavior), only one form significantly and independently predicted the extent to which an individual engaged in hoarding behavior. These results suggest that the fourfold model is an improvement over simpler models, such as those that only made a distinction between agentic narcissism and communal narcissism¹⁵. Taking into account the motives (self-enhancement and self-protection) presumed to underlie narcissism contributes to the construct's predictive power of thought and behavior^{26,34,40}.

Also, we found that higher narcissism can prompt pro-social thought and behavior. Specifically, we observed that (a) increases in sanctity were independently linked to weaker endorsement of unfounded COVID-19 health beliefs, (b) increases in sanctity independently predicted higher enactment likelihood of COVID-19 prevention behaviors, and (c) high sanctity, high heroism, and high admiration independently predicted stronger rates of emotional support to others.

Hence, narcissists will not always act and think in an antisocial manner. Instead, narcissism can be a double-edged sword: sometimes it is linked to anti-social thoughts and actions, whereas other times it is linked to pro-social thoughts and actions. Whether the consequence is anti-social or pro-social depends on the joint action of the domain in which the narcissism exists (agentic vs. communal), the motives that underlie it (self-enhancement vs. self-protection), and the criterion variable that is being predicted by any of the four grandiose narcissism forms.

Strengths, limitations, and future research

Our study is a foray into examining the diverse responses of narcissists to the COVID-19 pandemic. Our research has several strengths. For example, we: (a) tested a large sample; (b) obtained data from participants in many countries; (c) used varied instruments and methods; and (d) employed statistical techniques appropriate to the pertinent research questions. Importantly, our study was the first to draw a distinction between sanctity and heroism, indicating the validity of the fourfold model and its utility in predicting human thoughts and behaviors at least in the context of the pandemic. Relatedly, we provided initial evidence that communal narcissism can be understood in terms of self-enhancement and self-protection, similar to agentic narcissism in the NARC model²².

However, our research also has limitations that can be addressed in future research. To begin, we collected the data via convenience sampling and computer. These procedures may have led to less educated and less affluent people being underrepresented in the sample. Thus, despite our large and cross-cultural sample, the generalizability of our findings to the general population may be restricted. We focused solely on grandiose narcissism, albeit vulnerable narcissism might be relevant in explaining COVID-related thoughts and behaviors, as it is related to lower subjective well-being, poorer mental health, and stronger responses to stressful events⁷. Also, we assessed beliefs and behaviors via retrospection: we asked participants to remember what they did at an earlier time. Retrospections sometimes do not accurately reflect the thoughts that people had or the behaviors they enacted during an earlier time in their life⁴¹. Follow-up research will do well to use ecological momentary assessment. Third, the COVID-19 crisis may have unique features and characteristics that influenced our results. For example, the politics of the era may have caused the COVID-19 crisis to be viewed through a conservative versus liberal political lens, which might not be present in other crises. Additionally, our data could be re-analyzed to detect latent profiles that describe narcissistic individuals and their behaviors instead of forms of narcissism or motives. For instance, such profiling might identify rivalrous narcissists who are not grandiose. These individuals could be of interest to policymakers, as they are unlikely to follow medical recommendations in future crises. In the same vein, communal narcissists may be likely to help others assuming that their actions are noticed.^{11,19,42} Lastly, admiring narcissists might assist in practical matters (e.g., food provision, prevention of contagious diseases) assuming their actions are public and receive praise²¹.

Coda

We validated the fourfold model of grandiose narcissism, proposing four forms (admiration, rivalry, sanctity, heroism) based on distinctions between motives (self-enhancement vs. self-protection) and domains (agentic vs. communal). Further, we showed that these forms contribute to distinct thoughts and behaviors, at least during a societal crisis. Finally, we demonstrated that narcissism can be linked to pro-social thinking and behaving during such a crisis. Our research expands the narcissism literature and is generative.

Data availability

All data generated or analysed during this study are included in this published article [and its supplementary information files] available on the project's OSF page: https://osf.io/pv2zy/?view_only=f7e745f9133a4b978af1d26b73ae1963.

Received: 1 February 2024; Accepted: 17 July 2024

Published online: 30 July 2024

References

1. Ahorsu, D. K. *et al.* The fear of COVID-19 scale: Development and initial validation. *Int. J. Ment. Heal. Addict.* **20**, 1537–1545 (2022).

2. Ernst, M. *et al.* Loneliness before and during the COVID-19 pandemic: A systematic review with meta-analysis. *Am. Psychol.* **77**, 660–677 (2022).
3. Thomaes, S., Brummelman, E. & Sedikides, C. Narcissism: A social-developmental perspective. In *The SAGE Handbook of Personality and Individual Differences* (eds Zeigler-Hill, V. & Shackelford, T. K.) 377–396 (Sage Publications, London, 2018).
4. Grapsas, S., Brummelman, E., Back, M. D. & Denissen, J. J. The “why” and “how” of narcissism: A process model of narcissistic status pursuit. *Perspect. Psychol. Sci.* **15**, 150–172 (2020).
5. Miller, J. D., Back, M. D., Lynam, D. R. & Wright, A. G. C. Narcissism today: What we know and what we need to learn. *Curr. Dir. Psychol. Sci.* **30**, 519–525 (2021).
6. Sedikides, C. In search of Narcissus. *Trends Cogn. Sci.* **25**, 67–80 (2021).
7. Miller, J. D. *et al.* Vulnerable narcissism is (mostly) a disorder of neuroticism. *J. Personal.* **86**, 186–199 (2018).
8. Sedikides, C. & Campbell, W. K. Narcissistic force meets systemic resistance: The energy clash model. *Perspect. Psychol. Sci.* **12**, 400–421 (2017).
9. Dinic, B. & Bodroza, B. COVID-19 protective behaviors are forms of prosocial and unselfish behaviors. *Front. Psychol.* **12**, 647710 (2021).
10. Yang, Z. *et al.* Communal narcissism: Social decisions and neurophysiological reactions. *J. Res. Personal.* **76**, 65–73 (2018).
11. Freis, S. D. & Brunell, A. B. Narcissistic motivations to help during the COVID-19 quarantine. *Personal. Individ. Differ.* **194**, 111623 (2022).
12. Gąsiorowska, W., Sioch, M. & Żemojtel-Piotrowska, M. A. Narcissism, social support, and loneliness during the pandemic. *Personal. Individ. Differ.* **181**, Article 111002 (2021).
13. Federico, C. M., Golec de Zavala, A. & Baran, T. Collective narcissism, in-group satisfaction, and solidarity in the face of COVID-19. *Soc. Psychol. Personal. Sci.* **12**, 1071–1081 (2021).
14. Zdunek, R. R., Czarna, A. Z. & Sedikides, C. Grandiose (communal and agentic) narcissism and predicted (dis)obedience in the Milgram paradigm. *Personal. Individ. Differ.* **189**, 111514 (2022).
15. Gebauer, J. E., Sedikides, C., Verplanken, B. & Maio, G. R. Communal narcissism. *J. Pers. Soc. Psychol.* **103**, 854–878 (2012).
16. Sedikides, C. Self-protection. In *Handbook of Self and Identity* 2nd edn (eds Leary, M. R. & Tangney, J. P.) 327–353 (Guilford Press, New York, 2012).
17. Abele, A. E. & Wojciszke, B. Agency and communion from the perspective of self and others. *J. Pers. Soc. Psychol.* **93**, 751–763 (2007).
18. Gebauer, J. E. & Sedikides, C. Communal narcissism: Theoretical and empirical support. In *Handbook of Trait Narcissism* (eds Hermann, A. D. *et al.*) 69–77 (Springer, New York, 2018).
19. Gebauer, J. E. & Sedikides, C. Agency and communion in grandiose narcissism. In *Agency and Communion in Social Psychology* (eds Abele, A. E. & Wojciszke, B.) 90–102 (Routledge Press, New York, 2018).
20. Kwiatkowska, M. M., Julkowski, T., Rogoza, R., Żemojtel-Piotrowska, M. & Fatfouta, R. Narcissism and trust: Differential impact of agentic, antagonistic, and communal narcissism. *Personal. Individ. Differ.* **137**, 139–143 (2019).
21. Mahadevan, N., Gregg, A. P. & Sedikides, C. Is self-regard a sociometer or a hierometer? Self-esteem tracks status and inclusion, narcissism tracks status. *J. Pers. Soc. Psychol.* **116**(3), 444–466 (2019).
22. Back, M. D. *et al.* Narcissistic admiration and rivalry: Disentangling the bright and dark sides of narcissism. *J. Pers. Soc. Psychol.* **105**, 1013–1037 (2013).
23. Alicke, M. D. & Sedikides, C. Self-enhancement and self-protection: What they are and what they do. *Eur. Rev. Soc. Psychol.* **20**(1), 1–48 (2009).
24. Sedikides, C. & Gregg, A. P. Self-enhancement: Food for thought. *Perspect. Psychol. Sci.* **3**(2), 102–116 (2008).
25. Sedikides, C. Self-construction, self-protection, and self-enhancement: A homeostatic model of identity protection. *Psychol. Inq.* **32**, 197–221 (2021).
26. Żemojtel-Piotrowska, M., *et al.* *Narcissism and Social Domain Beliefs: Communal Narcissists Can Perceive Themselves to be Either Saints or Superheroes*. Unpublished manuscript, Institute of Psychology, Cardinal Stefan Wyszyński University in Warsaw (2023a).
27. Giacomini, M. & Jordan, C. H. Validating power makes communal narcissists less communal. *Self Identity* **14**, 583–601 (2015).
28. Konrath, S., Ho, M. H. & Zarins, S. The strategic helper: Narcissism and prosocial motives and behaviors. *Curr. Psychol.* **35**, 182–194 (2016).
29. Van Lange, P. A. M. & Sedikides, C. Being more honest but not necessarily more intelligent than others: Generality and explanations for the Muhammad Ali effect. *Eur. J. Soc. Psychol.* **28**, 675–680 (1998).
30. Brzóška, P. *et al.* Testing the underlying structure of unfounded beliefs about COVID-19 around the world. *Think. Reason.* <https://doi.org/10.1080/13546783.2023.2259539> (2023).
31. Pennycook, G., McPhetres, J., Bago, B. & Rand, D. G. Beliefs about COVID-19 in Canada, the United Kingdom, and the United States: A novel test of political polarization and motivated reasoning. *Pers. Soc. Psychol. Bull.* **48**, 750–765 (2022).
32. Nowak, B. *et al.* Adaptive and maladaptive behavior during the COVID-19 pandemic: The roles of Dark Triad traits, collective narcissism, and health beliefs. *Personal. Individ. Differ.* **167**, 110232 (2020).
33. Sawicki, A. J., *et al.* The fear of COVID-19 scale: Its structure and measurement invariance across 48 countries. *Psychol. Assess.* **34**, 294–310 (2022).
34. Żemojtel-Piotrowska, M., *et al.* *Threat or Opportunity to Support the Ingroup? Collective Narcissists' Motivation During the COVID-19 Pandemic*. Unpublished manuscript, Institute of Psychology, Cardinal Stefan Wyszyński University in Warsaw (2023b).
35. Brislin, R. W. Back-translation for cross-cultural research. *J. Cross Cult. Psychol.* **1**(3), 185–216 (1970).
36. Yuan, K. H. & Bentler, P. M. Three likelihood-based methods for mean and covariance structure analysis with nonnormal missing data. *Sociol. Methodol.* **30**, 165–200 (2000).
37. Brown, T. A. *Confirmatory factor analysis for applied research* (Guilford Press, New York, 2015).
38. Byrne, B. M. *Structural equation modeling with EQS and EQS/Windows* (Sage Publications, London, 1994).
39. Rutkowski, L. & Svetina, D. Assessing the hypothesis of measurement invariance in the context of large-scale international surveys. *Educ. Psychol. Measur.* **74**, 31–57 (2014).
40. Żemojtel-Piotrowska, M., Piotrowski, J., Sawicki, A. & Jonason, P. K. We will rescue Italy, but we dislike the European Union: Collective narcissism and the COVID-19 threat. *Group Process. Intergroup Relat.* **25**, 892–901 (2021).
41. Unsworth, N., McMillan, B. D., Brewer, G. A. & Spillers, G. J. Individual differences in everyday retrospective memory failures. *J. Appl. Res. Mem. Cogn.* **2**(1), 7–13 (2013).
42. Van Bavel, J. J. *et al.* Using social and behavioural science to support COVID-19 pandemic response. *Nat. Hum. Behav.* **4**, 460–471 (2020).

Acknowledgements

The work of Magdalena Żemojtel-Piotrowska and Jarosław Piotrowski was supported by grant 2017/26/E/HS6/00282 from the National Science Centre, Poland. The work of Artur Sawicki was supported by grant number 0086/DIA/2017/46 financed by the Ministry of Science and Higher Education in Poland. The work of Peter K. Jonason was partially funded by the Polish National Agency for Academic Exchange (PPN/

ULM/2019/1/00019/U/00001) and a grant from the National Science Centre of Poland (2019/35/B/HS6/00682). The work of Martina Klicperova-Baker and Iva Polackova Solcova was supported by the NPO "Systemic Risk Institute" no. LX22NPO5101, funded by European Union—Next Generation EU (Ministry of Education, Youth and Sports, NPO: EXCELES), IOCB, and Strategie AV21. The work of Narine Khachatryan was supported by the RA Science Committee, in the frames of the research project № 20TTSH-070. The authors declare, in accordance to national laws, that there was no direct collaboration between researchers from conflicting countries, where applicable.

Author contributions

Magdalena Żemojtel-Piotrowska: writing a first draft, conceptualization, funding, study design, supervision of the project. Artur Sawicki: statistical analysis, data curation, commenting, writing method and results section. Jarosław Piotrowski: co-supervising the project, study design, commenting. John Skowronski, Constantine Sedikides: co-writing and editing a draft, conceptualization, supervising. Uri Lifshin, Mabelle Kretchner, Peter Jonason: commenting, conceptualization, data collection. Remaining authors: data collection in their countries, preparing national versions of their surveys, commenting, co-funding (as indicated in the Authors note).

Additional information

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1038/s41598-024-67954-2>.

Correspondence and requests for materials should be addressed to M.Ż.-P.

Reprints and permissions information is available at www.nature.com/reprints.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Open Access This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

© The Author(s) 2024