Who Is Impacted? Personality Predicts Individual Differences in Psychological Consequences of the COVID-19 Pandemic in Germany

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Abstract

The COVID-19 pandemic has led to changes in people's private and public lives that are unprecedented in modern history. However, little is known about the differential psychological consequences of restrictions that have been imposed to fight the pandemic. In a large and diverse German sample ($N = 1,320$), we examined how individual differences in psychological consequences of the pandemic (perceived restrictiveness of government-supported measures, global pandemic-related appraisals, subjective well-being) were associated with a broad set of faceted personality traits (Big Five, Honesty-Humility, Dark Triad). Facets of Extraversion, Neuroticism, and Openness were among the strongest and most important predictors of psychological outcomes, even after controlling for basic sociodemographic variables (gender, age). These findings suggest that psychological consequences of the pandemic depend on personality and thus add to the growing literature on the importance of considering individual differences in crisis situations.

Keywords

The COVID-19 pandemic has led to changes in people's private and public lives that are unprecedented in modern history. However, little is known about the differential psychological consequences of restrictions that have been imposed to fight the pandemic. Thus, we investigated how basic sociodemographic variables (gender, age) and a broad range of personality traits (Big Five, Honesty-Humility, Dark Triad) relate to people's experiences of and adjustment to the COVID-19 situation in Germany—a country among those with the most confirmed COVID-19 cases in early April 2020 (World Health Organization, 2020) but quick to provide widespread governmental interventions.

Background

As the number of COVID-19 cases increased in early March, German state and local governments responded by implementing various temporary regulations. In mid-March, most states imposed extensive restrictions on public and economic life, including banning mass gatherings, the closure of schools and leisure facilities, and restrictions on visits to long-term care facilities (see Bundesrechtsanwaltskammer, 2020, for an overview of state-issued regulations and decrees). On March 16, German federal and state governments agreed on nationwide restrictions encompassing the closure of most stores and

facilities (Bundesregierung, 2020a). However, there were still vast regional differences in the nature and extent of restrictions (Bundesrechtsanwaltskammer, 2020). On March 22, national restrictions were extended to include, among others, a ban on gatherings of more than two people from different households, keeping at least 1.5 m ($\sim$5 ft) distance to others, and the closure of additional nonessential shops and operations such as restaurants or barber shops (Bundesregierung, 2020b). Although stricter regulations have been in place in some regions, the situation has been comparable throughout Germany since then until April 20 when the first regulations were relaxed locally.

These restrictions, aimed at the protection and safety of citizens, affected everyday life in many ways. For instance, people's social lives were heavily impacted by restrictions on social contact, parents had to home-school their children due to the closure of schools, and several employees could either

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not continue their work or had to work from home. However, ongoing representative surveys by the German Federal Institute for Risk Assessment (Bundesamt für Risikobewertung, 2020) indicated that during our data collection phase, the imposed measures received high acceptance in the general public. Further, many psychological studies are currently being conducted, mostly revolving around mental health issues (e.g., Fried et al., 2020; Rajkumar, 2020; Wang et al., 2020). While this research is important and informative, most of these studies seek to uncover general patterns of experience and do not investigate how people differ in their crisis experiences. Such knowledge on individual differences is highly relevant; however, because the crisis may uniquely impact certain persons, leading to novel disadvantages and advantages of certain personality phenotypes. Below, we briefly review the existing literature on individual differences in reactions to the pandemic and imposed restrictions.

A German study (Kroencke et al., 2020) found that Neuroticism predicted more worrying and negative affect during the pandemic. Further, in a U.S. sample, clusters of general psychological responses to the pandemic (ignorant, panic, informed) were found that differed in their levels of Neuroticism, Openness, Agreeableness, and Conscientiousness (Stadler et al., 2020). Columbus (2020) found in two UK samples that Honesty-Humility was negatively associated with stockpiling behavior and intentions. Further, people high in Honesty-Humility refrained from stockpiling to maximize societal outcomes (i.e., serving the common good). In a similar study, Garbe et al. (2020) found that people high in Conscientiousness and people who felt more threatened by the coronavirus stockpiled more toilet paper. The perceived threat, in turn, was predicted by (Negative) Emotionality. Blagov (2020) found that self-reported current health behavior (i.e., social distancing, hygiene) was positively correlated with Agreeableness, Conscientiousness, and Neuroticism and negatively correlated with Extraversion, Psychopathy, and Machiavellianism.

Several personality traits have been identified as predictors of compliance with and acceptance of coronavirus guidelines. Conscientiousness (Abdelrahman, 2020; Bogg & Milad, 2020) predicted more, and Extraversion less compliance (Brouard et al., 2020; Carvalho et al, 2020). Leder et al. (2020) indicated that participants mostly followed guidelines that protected themselves rather than the general public. Further, Wolff et al. (2020) found that boredom-prone individuals found it more difficult to adhere to guidelines, while individuals high in self-control adhered more easily. Lastly, Zettler et al. (2020) found in a Danish sample that age and (Negative) Emotionality were positively, and a Dark Factor of Personality negatively, related to accepting personal restrictions to fight COVID-19.

Despite a rapidly growing body of research on individual differences in how people behave, feel, and think during the crisis, it is difficult to generalize findings from other nations to Germany due to differences in imposed measures and the severity of the situation. Further, to our knowledge, there are to date no published studies that systematically examine how a broad set of facet-level personality variables is associated with a broad range of psychological outcomes during the COVID-19 pandemic.

Current Study

We aimed to examine how individual differences in psychological consequences of the COVID-19 pandemic (perceived restrictiveness of government-implemented measures; global pandemic-related appraisals; subjective well-being) could be predicted by a broad set of faceted personality traits (Big Five, Honesty-Humility, Dark Triad), especially above and beyond basic sociodemographic variables (gender, age). Broadly, we expected higher Extraversion, Neuroticism, and Openness to correlate with stronger restriction feelings, and higher Neuroticism with stronger negative appraisals and less subjective well-being during the crisis. Beyond these broad-stroke expectations, we examined the relative contributions of sociodemographic variables and more circumscribed facet-level traits to predicting the psychological outcomes. We specifically chose to also consider facets that have been shown to be uniquely associated with criteria in theoretically meaningful ways (Denissen et al., 2019) and incrementally predict a wide range of behavioral criteria over domains (Paunonen & Ashton, 2001; Soto & John, 2017a). As no a priori hypotheses were preregistered, this research is exploratory.

Method

Participants and Procedure

The online study was conducted on the formr survey platform (Arslan et al., 2018) and took place from April 3 to 19, 2020,[1] with the aim of $N > 1,000$ to have sufficient power for detecting small effect sizes (e.g., an $r = |.10|$ has 90% power with $N = 1,043$). Participants were recruited through advertisements on Facebook, university mailing lists (i.e., psychology students and a pool of predominantly senior citizens), and word of mouth. They were not compensated but offered automatically generated feedback on their traits as an incentive. Psychology students received course credit for participating.

A total of 1,547 participants provided data for the questionnaire part of the study. Listwise deletion was used to exclude cases without gender or age data, resulting in $N = 1,335$. Additionally, 15 participants were excluded because they did not meet our inclusion criteria (four were underage; four had spent the majority of the pandemic outside of Germany; five identified as gender nonbinary; two chose identical response options throughout certain questionnaires, indicating careless responding). This resulted in a final sample of $N = 1,320$ participants (age: $M = 44.36$ years, $SD = 14.29$, range: 18–88; gender: 58.64% female, 41.36% male) from all German states (range: 0.61% from Saarland to 22.50% from North Rhine-Westphalia). Participants' employment status ($n = 1,309$ responses; employed: 53.09%; college students: 12.45%; retirement: 11.84%; self-employed: 8.02%; unemployed: 2.60%) and education ($n = 1,240$ responses; master's degree: 23.47%;

Table 1. Overview of Questionnaire Instruments Used in This Study.

Measures	Reference	Response Scale		# Items	Constructs
Personality traits					
BFI-2-S [a]	Rammstedt et al. (2018)	Likert type (1–5)	disagree strongly–agree strongly	30	Big Five, each with three facets
HEXACO-60 [b]	Moshagen et al. (2014)	Likert type (1–5)	disagree strongly–agree strongly	6	Honesty-Humility, with four facets
Naughty Nine	Küfner et al. (2015)	Likert type (1–9)	does not apply–fully applies	9	Dark Triad (Narcissism, Machiavellianism, Psychopathy)
Psychological outcomes					
Protective measure restrictiveness [c]	(Created for this study)	Likert type (1–5)	not at all restricted–extremely restricted	33	Perceived restrictiveness of COVID-19 measures in Germany
Global COVID-19-related appraisals [d]	(Created for this study)	Likert type (1–5)	different response scales per item	7	Different appraisals of the pandemic situation and the government response
L-1 [e, f]	Beierlein et al. (2014)	Likert type (0–10)	completely dissatisfied–completely satisfied	1	Global life satisfaction
SOEP affective well-being [e, g]	Richter et al. (2017)	Likert type (1–5)	very rarely–very often	4	Affective well-being, affect balance

Note. Detailed information and a codebook are available at https://osf.io/5nvgz/. Descriptive statistics can be found in Tables 2 and 3. All items were self-report versions.
[a] Based on the BFI-2-S (Big Five Inventory-2 Short Form; Soto & John, 2017b). High retest reliabilities and good construct and criterion validity of the German BFI-2-S domain and facet scales have been demonstrated (Rammstedt et al., 2018). [b] Based on the HEXACO-60 items (Ashton & Lee, 2009). For Honesty-Humility and its facets, we selected the six items with the highest factor loadings in a psychometric examination of the German translation (Moshagen et al., 2014), resulting in two-item scales for the facets Sincerity and Fairness and single-item scales for Greed Avoidance and Modesty. [c] For details, see the main text at *Method → Instruments → Perceived restrictiveness of measures* and https://osf.io/5nvgz/. [d] For details, see the main text at *Method → Instruments → Global pandemic-related appraisals* and https://osf.io/5nvgz/. [e] Subjective well-being before (in February 2020) and during the COVID-19 pandemic (since March 23, 2020) was assessed separately. The order of assessment (i.e., before and during) was randomized across participants. Participants were asked to remember how they felt in February 2020 when indicating their well-being before the pandemic and asked to consider the period since March 23, 2020, when indicating their well-being during the pandemic. Subjective well-being was assessed as the average of percent-of-maximum-possible scores from global life satisfaction and general affective well-being (or affect balance). [f] Based on Schimmack et al. (2008). [g] Based on Schimmack (2009).

vocational training qualification: 19.44%; higher education entrance qualification: 17.82%; intermediate secondary education: 15.24%) were varied. Participants were asked to report personal information regarding their living situation during the pandemic, current work situation, occupation, health, gender, and age. In this study, we focused only on gender (0 = *female*, 1 = *male*) and age as covariates. Detailed sociodemographic sample breakdowns can be found at https://osf.io/5nvgz/.

Instruments

This study focused on person variables (Big Five and Honesty-Humility domains and facets; Dark Triad traits; gender; age) and cognitive-affective outcomes during the COVID-19 crisis (perceptions of protective measures' restrictiveness, global pandemic-related appraisals, subjective well-being). A summary of all measures can be found in Table 1 and a detailed description at https://osf.io/5nvgz/. Descriptive statistics (*M*s, *SD*s, αs, ω_{total}s) of all variables can be found in Tables 2 and 3. Below, we summarize important information for the psychological outcomes sampled, which were intercorrelated between −.46 and .55 (see https://osf.io/5nvgz/).

Perceived restrictiveness of COVID-19 protective measures. We compiled 33 measures against the pandemic that directly impact daily life (Table 2; details at https://osf.io/5nvgz/): 22 rules in effect nationwide[2] throughout the data collection period and 11 official recommendations regarding hygiene and personal behavior. Measures were retrieved from the official website of the German Federal Government (Bundesregierung, 2020a, 2020b), the German Federal Center for Health website (Bundeszentrale für gesundheitliche Aufklärung, 2020a, 2020b), and news reports (Diese Einschränkungen gelten in den Bundesländern, 2020). For each measure, participants indicated how restricted they felt by it.

We conducted a principal component analysis (PCA) to reduce the 33 measures to few superordinate "measure domains." Examining mathematical (parallel analysis, Velicer's Minimum Average Partial [MAP] test, Very Simple Structure [VSS] criteria, scree plot) and subjective criteria for the optimal number of components (bass-ackwards dendrograms, interpretability of the structure, sufficient granularity), we decided on an eight-component solution with promax rotation after excluding one item (i.e., closing of brothels[3]). This solution yielded a clear loading pattern and interpretable components comprised of restrictions regarding (1) Distancing, (2)

Table 2. Overview of Protective Measures and Their Perceived Restrictiveness.

Measure	Measure Domain	M	SD	Sparkline
Reducing contact	Distancing	3.74	1.18	
Avoiding travel	Travel	3.38	1.34	
No gatherings of two or more	Distancing	3.33	1.28	
Curfew	Distancing	3.30	1.41	
Culinary establishments closed	Retail/Services	3.20	1.21	
No parties	Distancing	3.12	1.30	
Sports facilities closed	Leisure/Gatherings	3.09	1.39	
Staying at home whenever possible	Distancing	3.07	1.31	
Wearing a face mask	Hygiene	3.02	1.41	
Leisure facilities closed	Leisure/Gatherings	2.99	1.26	
Shops closed (with exceptions)	Retail/Services	2.98	1.15	
Avoiding touching the face	Hygiene	2.95	1.29	
Avoiding contact with the elderly or ill	Companionship	2.92	1.33	
Avoiding touching others	Distancing	2.86	1.37	
Mass gathering events prohibited	Leisure/Gatherings	2.74	1.40	
Cultural institutions closed	Leisure/Gatherings	2.73	1.30	
Hairdressing and cosmetic businesses closed	Retail/Services	2.68	1.27	
Hotels etc. closed	Travel	2.66	1.40	
Nightlife establishments closed	Leisure/Gatherings	2.63	1.33	
Shopping infrequently	Retail/Services	2.63	1.16	
Educational institutions closed	Work/Study	2.61	1.45	
Keeping 1.5 m (5 ft) distance	Distancing	2.61	1.31	
No gatherings in societies etc.	Leisure/Gatherings	2.56	1.47	
Borders closed for noncommercial traffic	Travel	2.53	1.42	
Schools and day care closed	Children	2.28	1.54	
Working from home	Work/Study	2.27	1.33	
Restrictions on visits to care facilities	Companionship	2.13	1.32	
Avoiding public transportation	Work/Study	2.11	1.31	
Playgrounds closed	Children	1.88	1.35	
No religious gatherings	Companionship	1.61	1.11	
Washing hands	Hygiene	1.54	0.92	
Coughing and sneezing etiquette	Hygiene	1.34	0.78	
Brothels closed [a]	—	1.15	0.63	

Note. N = 1,320. Measure = short form of original item wording (for exact wordings, see https://osf.io/5nvgz/). Measure domain = label of principal component where the item had the highest loading (all primary loadings > |.30|; for details, see https://osf.io/5nvgz/); Sparkline = schematic smoothed density distribution. Measures are sorted in descending order according to their mean restrictiveness ratings.
[a] Item excluded from principal component analysis to get a clearer loading pattern and facilitate interpretation of components.

Leisure/Gatherings, (3) Travel, (4) Retail/Services, (5) Hygiene, (6) Children, (7) Work/Study, and (8) Companionship (details at https://osf.io/5nvgz/). For further analyses, we used the directly extracted standardized component scores found by regression ($M = 0$, $SD = 1$). However, to facilitate the psychological interpretation of the components via their descriptive statistics, we computed nonweighted averages across items (items were allocated to factors based on their highest loading > |.30|; see Table 3). As can be seen in Table 3, Distancing (e.g., staying at home; reducing contact to others) was perceived as most restrictive, and Children (i.e., schools, day care, and playgrounds closed) as least restrictive. Interfactor correlations ranged from −.07 to .55 (details at https://osf.io/5nvgz/).

Global pandemic-related appraisals. We included seven items designed to tap different aspects of appraisals of the pandemic and governmental responses: (a) overall restrictiveness (how restricted one felt by all measures collectively), (b) compliance easiness-difficulty (how easy or difficult one found it to comply with the regulations), (c) defiance-compliance (how consistently one actually complied with the regulations), (d) ineffectiveness-effectiveness (how ineffective or effective one believed the measures to be at stopping or slowing down the spread of the virus), (e) strictness (whether one thought the measures were appropriate, too lenient, or too strict), (f) government dissatisfaction-satisfaction (how dissatisfied or satisfied one was with the government response to the pandemic), and (g) pessimism-optimism (how optimistic or pessimistic one felt that the crisis would be successfully overcome). We recoded several items so that all were keyed into the same direction, signifying negative appraisal of the pandemic situation. As these negative appraisals were at least moderately intercorrelated (rs from .07 to .61, average r = .34), we conducted a PCA and extracted a single component ($\omega_{hierarchical}$ = .71), as indicated by parallel analysis, the Velicer MAP criterion, the VSS criterion, and the scree test (details at

Table 3. Descriptive Statistics of All Person Variables and Psychological Outcomes.

Variable	# Items	M	SD	Range	α	ω_{total}	Sparkline
Personality traits							
Extraversion	6	3.21	0.71	[1.17, 5.00]	.72	.73	
Sociability	2	2.96	0.94	[1.00, 5.00]	.57	—	
Assertiveness	2	3.31	0.95	[1.00, 5.00]	.74	—	
Energy Level	2	3.35	0.94	[1.00, 5.00]	.65	—	
Agreeableness	6	3.75	0.59	[1.67, 5.00]	.67	.69	
Compassion	2	4.10	0.74	[1.50, 5.00]	.55	—	
Respectfulness	2	3.91	0.75	[1.00, 5.00]	.52	—	
Trust	2	3.23	0.79	[1.00, 5.00]	.25	—	
Conscientiousness	6	3.57	0.70	[1.17, 5.00]	.76	.76	
Organization	2	3.52	1.01	[1.00, 5.00]	.76	—	
Productiveness	2	3.32	0.91	[1.00, 5.00]	.64	—	
Responsibility	2	3.88	0.70	[1.50, 5.00]	.40	—	
Neuroticism	6	2.76	0.81	[1.00, 5.00]	.82	.82	
Anxiety	2	2.97	0.91	[1.00, 5.00]	.48	—	
Depression	2	2.56	1.01	[1.00, 5.00]	.72	—	
Emotional Volatility	2	2.75	0.95	[1.00, 5.00]	.69	—	
Openness	6	3.69	0.70	[1.33, 5.00]	.71	.71	
Intellectual Curiosity	2	3.84	0.87	[1.00, 5.00]	.61	—	
Aesthetic Sensitivity	2	3.52	1.13	[1.00, 5.00]	.78	—	
Creative Imagination	2	3.70	0.85	[1.00, 5.00]	.64	—	
Honesty-Humility	6	3.63	0.65	[1.00, 5.00]	.53	.53	
Sincerity	2	3.68	0.92	[1.00, 5.00]	.41	—	
Fairness	2	3.72	1.09	[1.00, 5.00]	.50	—	
Greed Avoidance	1	3.12	1.06	[1.00, 5.00]	—	—	
Modesty	1	3.85	1.06	[1.00, 5.00]	—	—	
D3: Narcissism	3	4.25	2.03	[1.00, 9.00]	.84	.84	
D3: Machiavellianism	3	2.88	1.70	[1.00, 9.00]	.76	.76	
D3: Psychopathy	3	2.70	1.54	[1.00, 8.67]	.60	.60	
Psychological outcomes							
Measure domains							
Distancing	7	3.15	0.95	[1.00, 5.00]	.85	.86	
Leisure/Gatherings	6	2.79	0.94	[1.00, 5.00]	.78	.79	
Travel	3	2.86	1.16	[1.00, 5.00]	.78	.78	
Retail/Services	4	2.88	0.89	[1.00, 5.00]	.74	.75	
Hygiene	4	2.22	0.76	[1.00, 5.00]	.59	.62	
Children	2	2.08	1.29	[1.00, 5.00]	.74	—	
Work/Study	3	2.33	1.00	[1.00, 5.00]	.56	.57	
Companionship	3	2.22	0.90	[1.00, 5.00]	.53	.54	
General negative appraisal	7	2.59	0.66	[1.29, 5.00]	.77	.78	
Overall restrictiveness	1	3.18	1.04	[1.00, 5.00]	—	—	
Compliance difficulty	1	2.37	1.04	[1.00, 5.00]	—	—	
Defiance [a]	1	1.98	0.73	[1.00, 5.00]	—	—	
Ineffectiveness [a]	1	2.18	1.08	[1.00, 5.00]	—	—	
Strictness	1	3.10	0.93	[1.00, 5.00]	—	—	
Government dissatisfaction [a]	1	2.65	1.13	[1.00, 5.00]	—	—	
Pessimism [a]	1	2.69	1.06	[1.00, 5.00]	—	—	
Subjective well-being							
Subjective well-being pre	2[b]	70.82	17.47	[4.17, 100.00]	.85	—	
Subjective well-being during	2[b]	56.69	21.31	[0.00, 100.00]	.86	—	
Life satisfaction pre [c]	1	73.06	19.67	[0.00, 100.00]	—	—	
Life satisfaction during [c]	1	58.36	24.24	[0.00, 100.00]	—	—	
Affect balance pre [c]	2[d]	68.57	17.80	[0.00, 100.00]	.67	—	
Affect balance during [c]	2[d]	55.02	21.30	[0.00, 100.00]	.70	—	

Note. N = 1,320. # Items = number of items (or variables) in the scale; Range = minimum and maximum values found in the sample (for the full breadth of the Likert-type response scales, see Table 1); α = unstandardized Cronbach's α for scales with three or more items; standardized α for two-item scales (equivalent to the Spearman–Brown coefficient, see Eisinga et al., 2013); ω_{total} = McDonald's ω_{total}, reported only for scales with three or more items; internal consistencies cannot be computed for single-item scales; Sparkline = schematic smoothed density distribution; D3 = Dark Triad; pre = retrospectively reported well-being before the implementation of protective measures; during = current well-being since the implementation of protective measures. Descriptive statistics for measure domains were computed based on nonweighted item scores, with items allocated to domains based on their highest loading > |.30| in principal component analysis (see Table 2; for details, see OSF: https://osf.io/5nvgz/); other analyses use directly extracted standardized component scores (with M = 0, SD = 1). General negative appraisal = nonweighted aggregate of seven global appraisals (listed directly underneath); other analyses use the directly extracted standardized component score (with M = 0, SD = 1).
[a] Appraisal items that have been recoded and renamed. [b] The two items are life satisfaction and affect balance (see the main text at Method → Instruments → Subjective well-being). [c] Values have been transformed to percent-of-maximum-possible scores. [d] The two items are the positive emotion item and the mean of the three negative emotion items (see the main text at Method → Instruments → Subjective well-being).

Table 4. Bivariate Pearson Correlations Between Person Variables and Psychological Outcomes.

Psychological Outcome Variables	Sociodem.		Extraversion				Agreeableness				Conscientiousness				Neuroticism				Openness				Honesty-Humility					Dark Traits		
	Gen.	Age	E	Soc.	Ass.	Ene.	A	Com.	Res.	Tru.	C	Org.	Pro.	Resy.	N	Anx.	Dep.	Emo.	O	Int.	Aes.	Cre.	H	Sin.	Fai.	Gre.	Mod.	Nar.	Mach.	Psyc.
Protective measures																														
Distancing																														
No gatherings of two or more	−.10	−.19	.16	.20	.03	.13	.08	.16	.03	.01	−.01	−.03	−.02	.03	.10	.10	.09	.07	−.05	.01	−.06	−.05	.02	−.02	.03	.02	.04	.09	.02	−.07
Reducing contact	−.08	−.16	.16	.18	.05	.14	.08	.15	.03	.02	.02	−.01	.00	.06	.08	.08	.07	.04	.00	.02	.02	−.04	.01	−.04	.02	.02	.04	.07	.03	−.08
Avoiding touching others	−.10	−.17	.20	.23	.08	.15	.10	.19	.02	.01	.02	.01	.00	.05	.09	.09	.07	.07	−.01	.02	.00	−.04	.03	−.02	.03	.01	.06	.10	.01	−.08
Avoiding touching others	−.10	−.02	.11	.17	.03	.06	.14	.19	.07	.07	.00	.00	−.01	.02	.05	.04	−.06	.02	−.02	−.03	.01	−.02	.07	.03	.05	.08	.02	.06	.00	−.10
No parties	−.04	−.12	.22	.26	.06	.17	.10	.15	.04	.07	.04	.01	.04	.05	.00	.03	−.03	.03	.00	.02	−.01	−.01	−.02	−.06	−.03	−.03	−.01	.08	.02	−.07
Staying at home whenever possible	−.01	−.15	.19	.17	.05	.21	−.01	.05	−.04	−.03	.02	.00	.03	.03	.05	.05	.01	.06	−.02	.01	−.04	.00	−.04	−.03	−.03	−.03	−.01	.09	.02	.01
Keeping 1.5 m (~5 ft) distance possible	−.04	−.11	.04	.09	−.03	.03	.06	.10	.01	.04	−.04	−.02	−.05	−.01	.12	.12	.12	.05	−.02	−.01	.01	−.04	.02	−.03	.03	.05	.00	.06	.02	−.04
Curfew	−.03	−.11	.08	.07	.02	.09	.01	.04	.01	−.02	−.01	−.03	.00	.01	.06	.07	.04	.05	−.02	.00	−.01	−.04	.00	.00	.00	−.03	.02	.06	.03	.00
Leisure/Gatherings																														
Mass gathering events prohibited	.03	−.11	.28	.25	.12	.26	.04	.09	−.02	.01	.04	−.01	.05	.07	−.03	−.01	−.04	−.01	.12	.09	.14	.03	−.04	−.07	.01	.00	−.04	.10	.02	−.03
Nightlife establishments closed	.04	−.13	.18	.18	.08	.15	.00	.05	−.03	−.03	−.03	−.05	−.02	.03	.04	.04	.01	.05	.05	.05	.07	−.01	−.07	−.08	−.06	−.03	−.04	.10	.05	.01
Cultural institutions closed	.07	−.15	.23	.25	.10	.16	.00	.05	−.05	−.02	−.03	−.05	−.01	−.01	.02	.01	.01	.01	.01	.03	.02	−.02	−.10	−.08	−.06	−.03	−.04	.12	.04	.00
Leisure facilities closed	.00	.04	.15	.09	.09	.16	−.02	.08	−.04	−.01	.00	−.04	.02	.03	.07	.08	.05	.01	.30	.11	.40	.10	.03	−.01	.04	.02	.02	.09	−.01	−.04
Sports facilities closed	−.01	−.14	.12	.11	.02	.13	−.01	.04	−.02	−.03	.04	.00	.05	.05	.07	.08	.05	.04	.00	.01	.03	−.01	−.04	−.02	−.03	−.03	−.02	.06	.00	.02
No gatherings in societies, etc.	.02	−.12	.18	.14	.04	.22	.03	.03	−.01	−.03	.09	.03	.09	.10	−.01	.00	−.04	.00	−.01	.08	−.07	−.01	.04	.01	.07	.03	−.03	.06	.00	.00
Travel																														
Borders closed for noncommercial traffic	−.01	.01	.18	.12	.12	.18	−.07	−.01	−.09	−.06	.03	.01	.03	.04	.00	.00	−.05	.06	.01	.01	.01	.01	−.06	.00	−.04	−.09	−.06	.07	.03	−.03
Hotels, etc. closed	−.04	.00	.18	.13	.12	.16	−.01	.04	−.06	−.02	.04	.02	.01	.06	−.01	.01	−.05	.02	.08	.06	.07	.05	−.04	−.01	−.03	−.04	−.03	.06	.03	−.03
Avoiding travel	.02	.16	.13	.09	.08	.13	−.05	−.03	−.10	−.03	.05	.02	.07	.04	.01	.01	−.04	.05	−.05	−.06	−.03	−.02	−.03	.03	.00	−.07	−.09	−.02	.05	.00
Retail/services																														
Hairdressing, cosmetic businesses closed	.03	.17	.07	.06	.02	.01	−.03	.01	−.06	−.09	.12	.10	.11	.06	.09	.10	.01	.03	−.11	−.12	−.08	−.04	−.03	.03	.01	−.15	−.07	−.01	.00	.02
Shops closed (with exceptions)	−.01	−.01	.03	.06	−.02	.03	−.03	.00	−.01	−.04	.03	.01	.05	.00	.09	.10	.10	.06	−.06	−.03	−.04	−.05	−.06	−.05	−.01	−.07	−.03	.04	−.02	−.03
Culinary establishments closed	.04	−.01	.16	.15	.10	.12	.01	.07	−.01	−.04	.02	−.03	.05	.03	.03	.02	.01	.06	−.01	.00	.00	−.03	−.07	−.05	−.03	−.10	−.03	.09	.00	−.03
Shopping infrequently	−.01	.17	.01	.05	−.03	.01	−.02	.02	−.03	−.04	−.02	−.03	−.01	.00	.09	.10	.10	.09	−.02	.00	.00	−.05	−.02	−.01	.02	−.06	−.03	.06	.02	.01
Hygiene																														
Coughing and sneezing etiquette	−.13	−.01	.03	.06	−.02	.03	−.03	.00	−.10	−.05	.03	.01	.05	−.09	.09	.10	.10	.12	−.11	−.08	−.09	−.07	−.06	−.05	−.06	−.02	−.11	.04	.06	.14
Washing hands	.03	−.01	−.04	.00	.01	−.04	−.13	−.14	−.14	−.06	−.07	−.03	−.04	−.07	.07	.08	.13	.07	−.03	−.03	−.11	.01	−.07	−.05	−.04	−.05	−.10	.07	.05	.11
Avoiding touching the face	−.01	−.02	−.03	.00	.00	−.05	−.02	−.09	−.10	−.05	−.01	−.02	.05	−.05	.09	.08	.08	.15	−.03	−.07	−.07	−.09	−.06	−.01	−.04	−.05	.03	.08	.06	−.05
Wearing a face mask	.02	−.05	.00	.02	−.04	−.03	.02	.06	−.02	.01	−.07	−.05	−.07	−.02	.17	.14	.15	.06	−.03	−.05	.02	−.04	.00	.03	−.01	.00	.03	.08	.04	−.05
Children																														
Playgrounds closed	−.06	−.06	.07	.06	−.01	.07	.02	.04	.00	−.03	.06	.02	.07	.06	.02	.03	.00	.06	−.10	−.03	−.11	−.05	.05	.03	.08	.02	−.03	.00	−.01	.06
Schools and day care closed	−.08	.00	.02	.04	−.03	.01	.02	.08	.02	.00	.04	−.01	.03	.02	.01	.02	.00	.04	−.08	−.05	−.07	.06	.04	.06	.04	−.02	−.04	−.07	−.02	−.04
Work/Study																														
Avoiding public transportation	−.07	−.23	.06	.05	.00	.09	.01	.04	−.05	.01	−.08	−.08	−.08	−.04	−.12	.07	.03	.08	−.08	.06	−.07	−.03	−.01	−.07	−.03	.03	.06	.17	.03	−.02
Educational institutions closed	−.01	−.15	.01	.02	−.02	.02	.00	.04	−.04	.00	−.09	−.07	−.07	−.03	.09	.07	.10	.04	.07	.06	.11	−.04	−.03	−.03	−.03	.04	.03	.14	.03	.00
Educational institutions closed	−.11	−.22	.12	.09	.01	.16	.00	.12	.00	.06	.01	.00	−.01	.03	.06	.06	.04	.05	.12	.11	.14	.00	.02	−.07	−.04	.06	.07	.13	.01	−.08
Working from home	.09	−.21	.09	.11	.03	.06	.03	.07	.10	.10	−.06	−.04	−.08	−.01	.05	.04	.06	.04	.00	.03	.01	−.04	−.01	−.03	.04	.12	.04	.12	.04	−.03
Companionship																														
No religious gatherings	−.13	.21	.04	.06	.03	.00	.18	.21	.10	.10	.05	.03	.05	.05	.00	.00	−.03	−.03	.06	−.06	.14	.03	.16	.07	.16	.12	.01	−.08	−.09	−.17
Restrictions on visits to care facilities	−.05	.10	.07	.07	.02	.07	.10	.09	.05	.09	.04	.01	.04	.05	−.01	−.01	−.01	−.01	.00	−.05	.06	−.03	.07	.01	.12	.05	−.07	−.03	−.03	−.07
Avoiding contact with the elderly or ill	−.17	.15	.04	.06	.03	.01	.04	.11	.00	−.01	.08	.03	.12	.05	.07	.07	.07	.03	−.08	−.11	−.04	−.03	.06	.07	.05	.00	−.01	−.09	−.07	−.04
Brothels closed	.18	.01	.00	−.01	.01	.00	−.09	−.08	−.08	−.05	−.05	−.04	−.01	−.07	.02	.03	.02	.00	−.03	−.06	−.02	.01	−.14	−.07	−.10	−.07	−.13	.05	.10	.12

(continued)

Table 4. (continued)

	Sociodem.		Extraversion				Agreeableness				Conscientiousness				Neuroticism				Openness				Honesty-Humility					Dark Traits		
Psychological Outcome Variables	Gen.	Age	E	Soc.	Ass.	Ene.	A	Com.	Res.	Tru.	C	Org.	Pro.	Resy.	N	Anx.	Dep.	Emo.	O	Int.	Aes.	Cre.	H	Sin.	Fai.	Gre.	Mod.	Nar.	Mach.	Psyc.
Global appraisals																														
General negative appraisal	.11	−.05	.02	.04	−.03	.03	−.17	−.13	−.16	−.09	−.06	−.06	−.01	−.07	.12	.08	.11	.11	−.08	−.05	−.10	−.03	−.12	−.02	−.12	−.05	−.11	.01	.06	.19
Overall restrictiveness	.01	−.13	.11	.11	.02	.11	−.03	.05	−.07	−.05	.00	−.02	.01	.02	.13	.12	.10	.10	−.02	.00	−.02	−.03	−.03	−.03	−.02	−.01	−.01	.09	.04	.04
Compliance difficulty	.02	−.09	.05	.06	−.03	.08	−.07	−.05	−.08	−.04	−.04	−.03	−.02	−.05	.13	.10	.11	.12	−.06	−.04	−.05	−.05	−.09	−.06	−.07	−.06	−.04	.09	.07	.11
Defiance	.13	.00	.02	.00	.01	.03	−.17	−.17	−.17	−.05	−.08	−.07	−.03	−.11	−.01	−.05	.00	.03	−.07	−.07	−.08	−.02	−.20	−.07	−.21	−.07	−.11	.04	.11	.20
Ineffectiveness	.12	.02	.00	.00	−.01	.01	−.16	−.15	−.12	−.10	−.02	−.04	.03	−.05	.02	−.01	.03	.03	−.08	−.06	−.10	.00	−.09	.03	−.10	−.06	−.12	−.05	.02	.19
Strictness	.09	.02	.03	.03	−.01	.05	−.05	−.08	−.05	.01	−.02	−.07	.03	.00	.09	.06	.10	−.01	−.04	.02	−.08	−.01	−.03	.00	−.04	.02	−.06	−.04	.03	.11
Gov. dissatisfaction	.08	−.02	−.05	.01	−.05	−.06	−.16	−.14	−.15	−.10	−.06	−.04	−.01	−.09	.09	.06	.10	.06	−.04	−.03	−.08	.04	−.06	.06	−.09	−.02	−.11	−.07	.01	.16
Pessimism	.07	−.01	−.13	−.06	−.07	−.16	−.19	−.13	−.15	−.16	−.07	−.01	−.07	−.09	.28	.24	.25	.21	−.09	−.05	−.07	−.07	−.11	−.02	−.09	−.07	−.11	.04	.05	.13
Subjective well-being																														
Subjective well-being (Global)	−.02	.01	.18	.06	.12	.24	.13	.06	.14	.11	.12	.06	.13	.11	−.50	−.42	−.49	−.34	.09	.08	.02	.11	.07	−.01	.07	.06	.08	−.03	−.04	−.07
Life satisfaction	−.03	.02	.14	.05	.09	.19	.12	.06	.12	.10	.12	.08	.12	.10	−.40	−.32	−.42	−.27	.08	.07	.03	.09	.07	.00	.06	.06	.08	−.03	−.04	−.08
Affect balance	−.01	−.01	.20	.06	.15	.26	.13	.05	.15	.11	.11	.04	.12	.12	−.54	−.47	−.51	−.38	.09	.08	.02	.12	.07	−.02	.08	.05	.07	−.03	−.03	−.05

Note. $N = 1{,}320$. Correlations $> |.10|$ are indicated in boldface, with positive correlations shaded in light blue and negative correlations in light red. Sociodem. = sociodemographic variables; Gen. = gender (with $0 = female$, $1 = male$); E = Extraversion; Soc. = Sociability; Ass. = Assertiveness; Ene. = Energy Level; A = Agreeableness; Com = Compassion; Res. = Respectfulness; Tru. = Trust; C = Conscientiousness; Org. = Organization; Pro. = Productiveness; Resy. = Responsibility; N = Neuroticism; Anx. = Anxiety; Dep. = Depression; Emo. = Emotional Volatility; O = Openness; Int. = Intellectual Curiosity; Aes. = Aesthetic Sensitivity; Cre. = Creative Imagination; Nar. = Narcissism; Mach. = Machiavellianism; Psyc. = Psychopathy.

Correlations $\geq |.054|/|.071|/|.091|$ are statistically significant at $p < .05/.01/.001$. Note that some correlations will be statistically significant by chance.

Table 5. Predictor Subsets Selected by the Genetic Algorithm for Each Outcome.

	Outcome Variables										
	Perceived Retrictiveness of Measure Domains										
Predictors	Dis.	Lei.	Tra.	Ret.	Hyg.	Chi.	Wor.	Com.	GNA	SWB	No. of Models
Sociodemographics											
Gender	1	1	0	1	1	1	1	1	1	1	9
Age	1	0	0	1	0	0	1	1	0	0	4
Extraversion											
Sociability	1	1	0	1	1	0	0	0	1	1	6
Assertiveness	0	0	1	0	1	0	0	1	1	0	4
Energy Level	1	1	1	1	0	1	1	1	1	0	8
Agreeableness											
Compassion	1	0	0	0	0	0	1	1	0	0	3
Respectfulness	0	0	1	0	0	0	1	0	1	0	3
Trust	1	0	0	1	0	0	0	0	0	0	2
Conscientiousness											
Organization	1	0	0	0	0	1	1	0	0	0	3
Productivity	0	0	0	1	0	1	0	0	0	0	2
Reponsibility	0	0	0	0	0	0	0	0	0	0	0
Neuroticism											
Anxiety	0	0	1	1	1	1	0	0	0	1	5
Depression	1	1	0	1	1	0	1	0	1	1	7
Emotional Volatility	0	0	0	1	0	0	0	0	0	1	2
Openness											
Intellectual Curiosity	0	1	0	1	0	0	1	1	0	0	4
Aesthetic Sensitivity	1	1	0	1	1	1	1	1	1	0	8
Creative Imagination	1	1	1	1	0	1	1	1	0	0	7
Honesty-Humility											
Sincerity	0	0	0	0	0	0	0	0	0	0	0
Fairness	0	0	0	0	0	1	0	1	1	0	3
Greed Avoidance	0	0	1	1	0	0	1	1	0	0	4
Modesty	0	1	0	0	1	0	0	1	1	1	5
Dark traits											
Narcissism	0	0	0	0	1	0	1	0	1	1	4
Machiavellianism	0	0	0	0	0	0	0	0	0	0	0
Psychopathy	0	0	0	0	1	0	0	0	1	1	3
SWB pre [a]										0	0
No. of predictors	10	8	6	13	9	8	12	11	11	8	
R^2_{adj}	.120	.126	.061	.064	.045	.038	.125	.129	.090	.279	

Note. $N = 1,320$. Binary genetic algorithms (GAs) were applied to optimize linear predictions of psychological outcomes (columns) from person variables (rows). For each outcome variable, 1 (shaded in gray) indicates inclusion of a predictor in the GA-optimized model; 0 indicates exclusion.
Outcome variables: GNA = general negative appraisal; Dis. = Distancing; Lei. = Leisure/Gatherings; Tra. = Travel; Ret. = Retail/Services Hyg; = Hygiene; Chi. = Children; Wor. = Work/Study; Com. = Companionship; SWB = subjective well-being during the pandemic.
No. of predictors = for each outcome variable, this is number of predictors in the optimized model; No. of models = for each predictor variable, this is the number of optimized models that included the predictor.
$R2adj$ = adjusted $R2$ of the GA-optimized model.
[a]Retrospectively reported subjective well-being before the implementation of measures; only considered as a predictor of SWB.

https://osf.io/5nvgz/). The standardized component score found by regression ($M = 0$, $SD = 1$) represents a global index of "general negative appraisal" used in further analyses. To facilitate the psychological interpretation of this index via its descriptive statistics, we also computed a nonweighted average across the seven items (see Table 3).

Subjective well-being. We asked participants to report their affective well-being and life satisfaction during and before the implementation of protective measures (the latter retrospectively; see Table 1 for details). In the affective well-being

instrument, the average of three negative emotion items was subtracted from the positive emotion item to compute an affect balance index (Schimmack, 2009). Life satisfaction and affect balance were highly correlated ($r = .74$ before; $r = .75$ during the pandemic), so we combined them into a composite measure of subjective well-being by averaging their percent-of-maximum-possible scores.

Data-analytical Strategy

All analyses were conducted in R (R Core Team, 2019). First, we computed descriptive statistics (Ms, SDs, internal
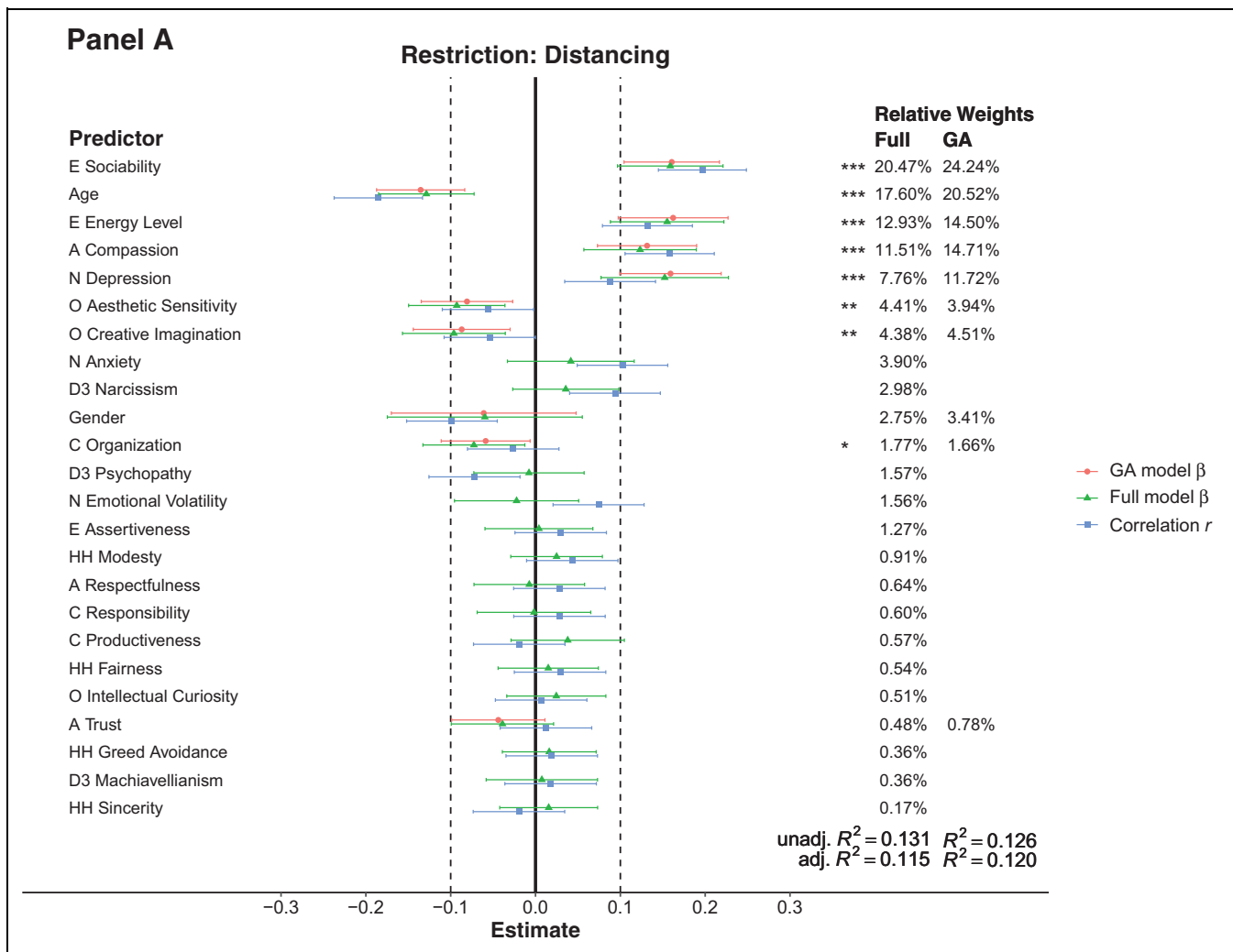
Figure 1. Prediction of perceived restrictiveness in eight protective measure domains. *Note.* N = 1,320. For each outcome (panel), βs for all predictors in the full model (green triangles) and the predictor subset of the GA-optimized model (red dots) as well as zero-order Pearson correlations (blue squares) are depicted along with their respective 95% confidence intervals. Regression weights (βs) have been standardized; except for gender (with 0 = *female*, 1 = *male*). Predictors are sorted in descending order according to their relative weights in the full model. Relative weights are given for full LMs and GA-optimized LMs as % of totally explained variance in the outcome (unadjusted R^2) that can be attributed to each predictor in the model. E = Extraversion; A = Agreeableness; C = Conscientiousness; N = Neuroticism; O = Openness; D3 = Dark Triad. unadj. R^2 = unadjusted R^2; adj. R^2 = adjusted R^2. */**/*** Indicate full model β is statistically significant at p < .05/.01/.001.

consistencies) for all scales using the psych package (Revelle, 2020). We then computed zero-order bivariate correlations between variables of interest and linear multiple regression models (LMs) predicting psychological outcomes (subjective restrictiveness of the eight measure domains, general negative appraisal, subjective well-being during the pandemic) from basic sociodemographic variables (gender, age) and all personality traits (15 Big Five facets, 4 Honesty-Humility facets, 3 Dark Triad traits). As regression weights (βs) cannot be used to rank predictors in terms of their relative importance, we computed their proportional contribution to the explained variance in the outcome variable via relative weights[4] (RWs) with the yhat package (Nimon et al., 2013). However, these full model analyses do not take into account multicollinearity among predictors, the stability and robustness of linear model

solutions, and overfitting of models to the data. Moreover, the variance explained by all predictors might be reasonably approximated, or even outperformed,[5] by a much smaller set of core predictors. To identify the subset of predictors most relevant for explaining variance in an outcome, we applied binary genetic algorithms (GAs) as a heuristic model selection technique using Scuccra's (2013) GA package (200 iterations; populations size = 50; elitism = 2; crossover probability = .80; mutation probability = .10). GAs have been shown to produce the same results as best subsets regression (Bozdogan, 2004) and usually introduce less estimation bias than Lasso-type methods (Savin, 2010). For multiple regression, models are represented using binary strings, with 1 and 0 indicating the inclusion or exclusion of each possible predictor, respectively. The GA mimics natural evolution: Parent models with better
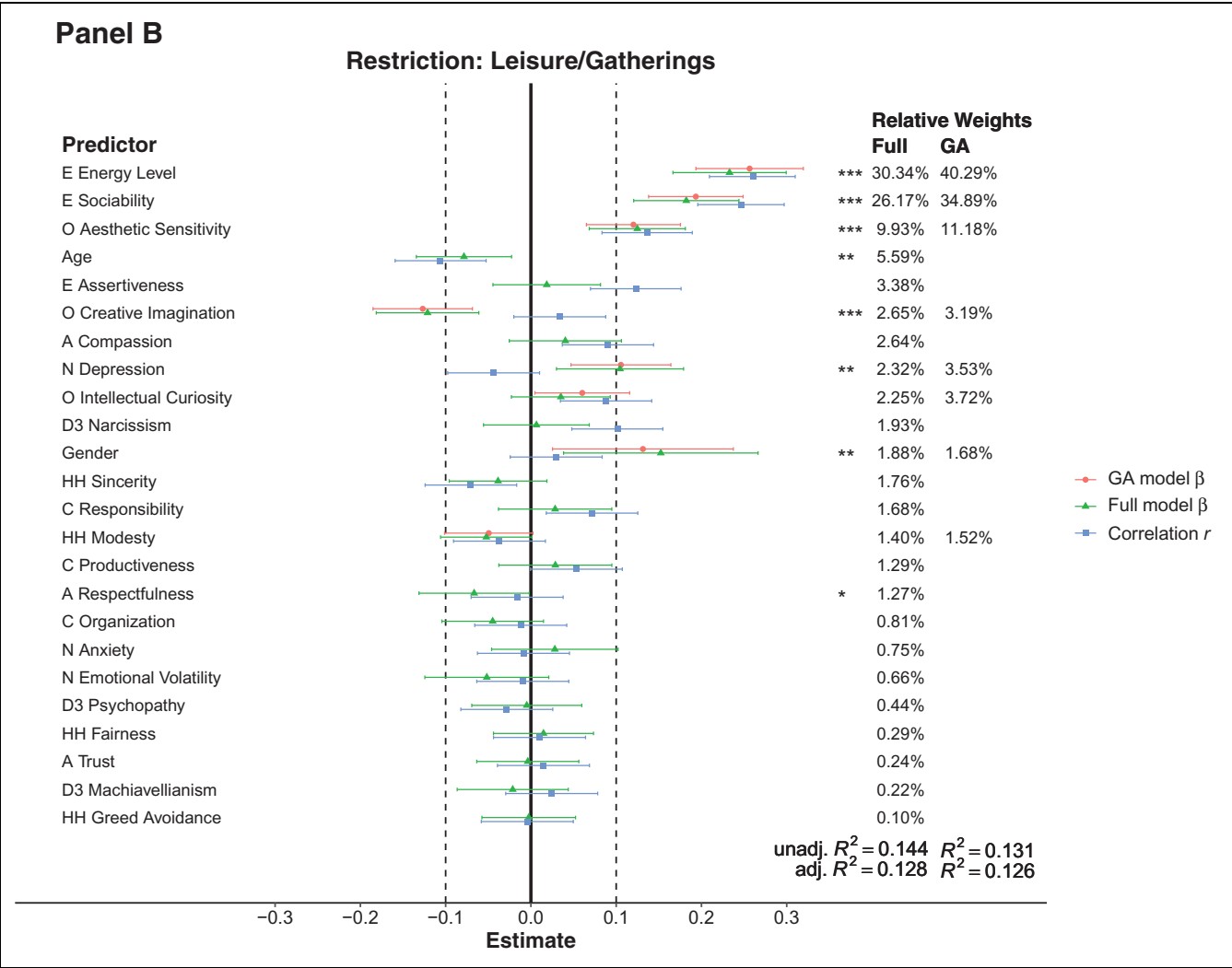
Figure 1. (continued).

fitness are more likely to mate and produce offspring models, repeated over several generations until fitness, evaluated by a selection criterion, does not improve any further (for details, see Bozdogan, 2004; Scrucca, 2013). We computed the information complexity criterion (ICOMP; Bozdogan, 2004) using the MuMIn package (Bartoń, 2020). ICOMP is a penalized likelihood method like Akaike's (1973) information criterion but selects simpler models and protects against multicollinearity (Bozdogan, 2004).

Overall, our analyses allowed examining (1) the relative contributions of each individual predictor and (2) the most parsimonious predictor sets. Regular and GA-optimized LMs thus served different purposes but would ideally converge on the most relevant and important predictors and thus point toward the robustness of findings across data analytical choices.

Transparency and Reproducibility

Our OSF project (https://osf.io/5nvgz/) contains all materials (with original item wordings and instructions; featuring also variables not reported here); preprocessed and processed data; R scripts to reproduce all findings; and additional analyses not reported here. The study was not preregistered and hence all analyses are exploratory. Because of this and the large sample size, we did not focus on null hypothesis significance testing (NHST) p values but on theoretically and practically meaningful patterns of effect sizes > |.10| or substantial predictive abilities in terms of RWs and binary selection by GAs.

Results

Descriptive Findings

Table 2 displays all COVID-19 protective measures, along with their respective PCA-based domain, ranked from being perceived as most to least restrictive. As can be seen, reducing contact to others to a bare minimum; forgoing travel; not meeting with people from other households in public; and being in curfew[6] were perceived as most restrictive. Brothels staying closed; coughing and sneezing into the elbow or a tissue;
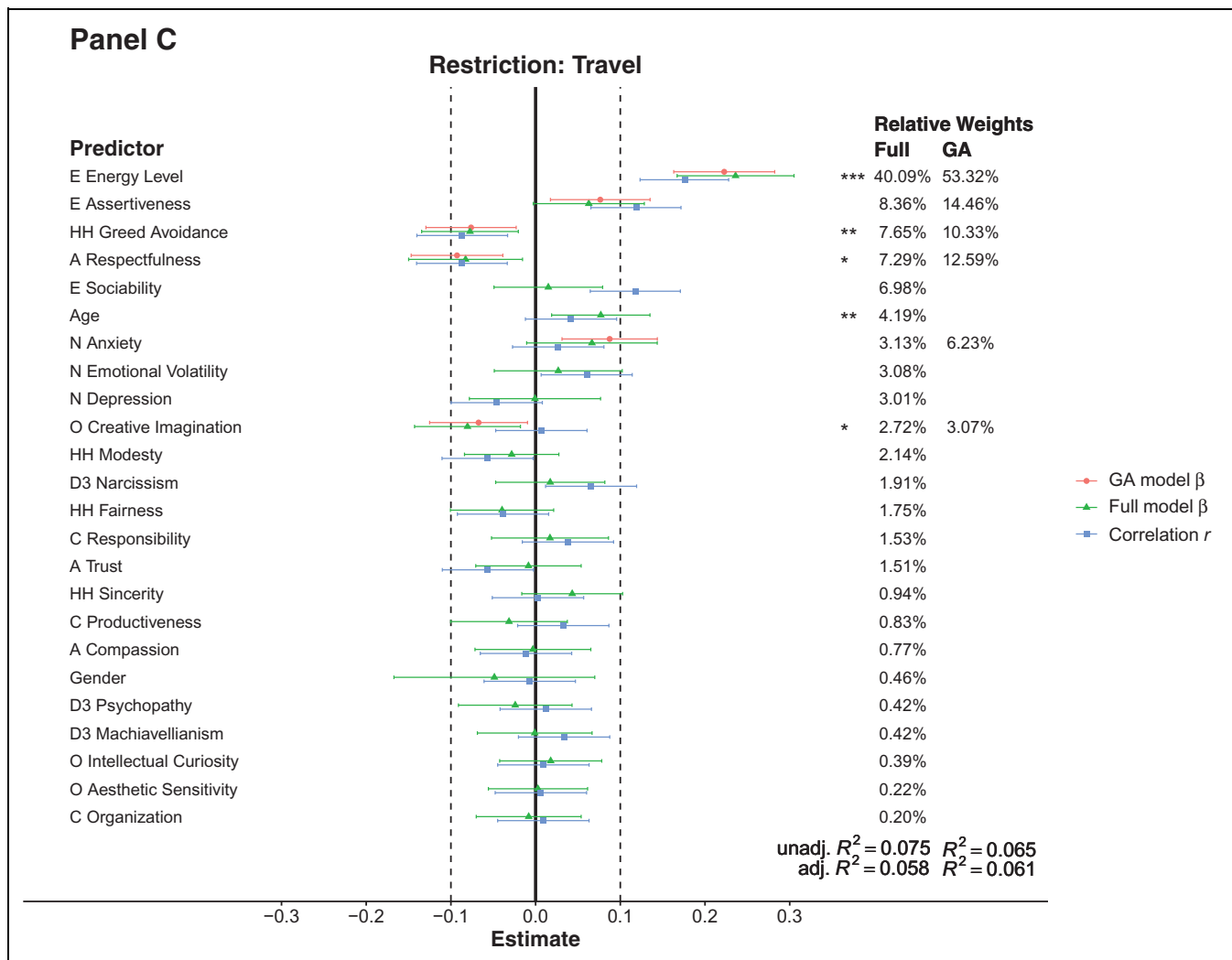
Figure 1. (continued).

regular and thorough handwashing; religious gatherings forbidden; and playgrounds staying closed were perceived as least restrictive. Table 3 contains descriptive statistics of person variables, global appraisals, and subjective well-being. As seen in Tables 2 and 3, almost all psychological outcome variables had substantial standard deviations, indicating the presence of individual differences that may be correlated with, and explained/predicted by, other person variables (see below).

Correlational Findings

Table 4 contains nuanced information on bivariate Pearson correlations (rs) between-person variables (sociodemographics: gender, age; Big Five domains with three facets each, Honesty-Humility with four facets; Dark Triad traits) and the three sets of psychological outcomes during the COVID-19 crisis (perceived restrictiveness of measures, global appraisals, subjective well-being). Correlations ranged from −.54 to .40.

As can be seen in Table 4, perceived Distancing restrictions were especially correlated with Extraversion, Neuroticism, and Agreeableness Compassion. Perceived Leisure/Gatherings restrictions were substantially correlated with Extraversion but also with Openness and Narcissism. Extraversion was also correlated with perceived restrictiveness of Travel restrictions. Honesty-Humility Greed Avoidance was correlated with feeling less restricted by Retail/Services restrictions. Openness, Agreeableness Respectfulness, and Honesty-Humility Modesty were correlated with conceiving Hygiene measures as less restricting, and Neuroticism with finding them more restricting. Extraversion Energy Level was correlated with finding restrictions concerning Children less restricting and Openness Aesthetic Sensitivity with finding them more restricting. Neuroticism, Openness, and Narcissism were correlated with finding Work/Study restrictions more restricting. Perceived Companionship restrictions were positively correlated with Agreeableness, Honesty-Humility, and Openness Aesthetic Sensitivity but negatively with Psychopathy. Further, Agreeableness, Honesty-Humility, and Openness Aesthetic Sensitivity were correlated with generally less, and Neuroticism and especially Psychopathy with more negative global appraisals. Lastly, Extraversion,
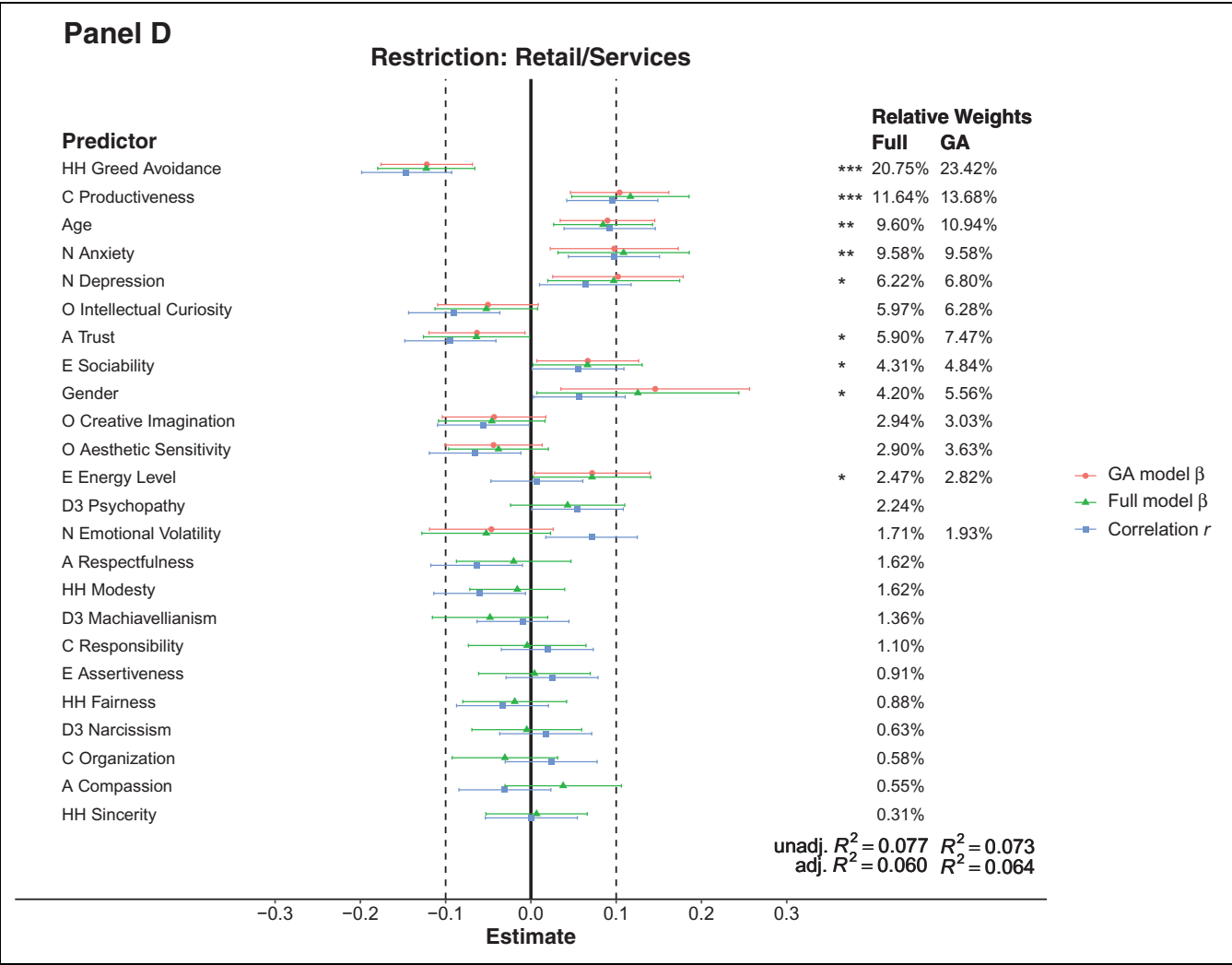
Figure 1. (continued).

Agreeableness, Conscientiousness, and Openness Creative Imagination were positively, and Neuroticism was negatively, correlated with subjective well-being.

Gender did not seem to be a substantial correlate of most psychological outcome variables (though correlated with some, e.g., perceived restrictiveness of avoiding personal contacts with the elderly or ill), while age showed several substantial effects, both positive and negative (e.g., higher age meant finding Distancing less, and Companionship restrictions more restrictive). This underscores that further analyses need to consider the effects of basic sociodemographic variables.[7]

There were also face-valid and conceptually plausible effects at the single measure level. For example, Openness was correlated with finding the closing of cultural institutions (e.g., theaters, operas, museums) more restrictive. Interestingly, some facets were substantially correlated with perceived restrictiveness of many COVID-19 protective measures domain (e.g., Extraversion Sociability and Energy Level), while other facets from the same domain were not (e.g., Extraversion Assertiveness). We next explored the

contributions of facets to the prediction of outcomes more closely using LMs.

Regression Findings

To avoid complexity, we focused only on 10 aggregated psychological outcome variables (eight protective measure domains, general negative appraisal, subjective well-being) to be predicted from all person variables. This still allowed casting a differentiated and reasonably comprehensive picture despite not predicting single measures or appraisals.[8]

We ran two sets of analyses: regular LMs and GA-optimized LMs. First, we ran LMs where each of the 10 outcomes was predicted from all 24 predictors (for subjective well-being during the pandemic, prior subjective well-being was included as a 25th predictor). These full model findings help evaluate each predictor's unique contributions toward explaining variance in an outcome. Besides the regression weight (β), the RW of the contribution of each predictor is of especial interest (i.e., the percentage of totally explained variance in an outcome that can be
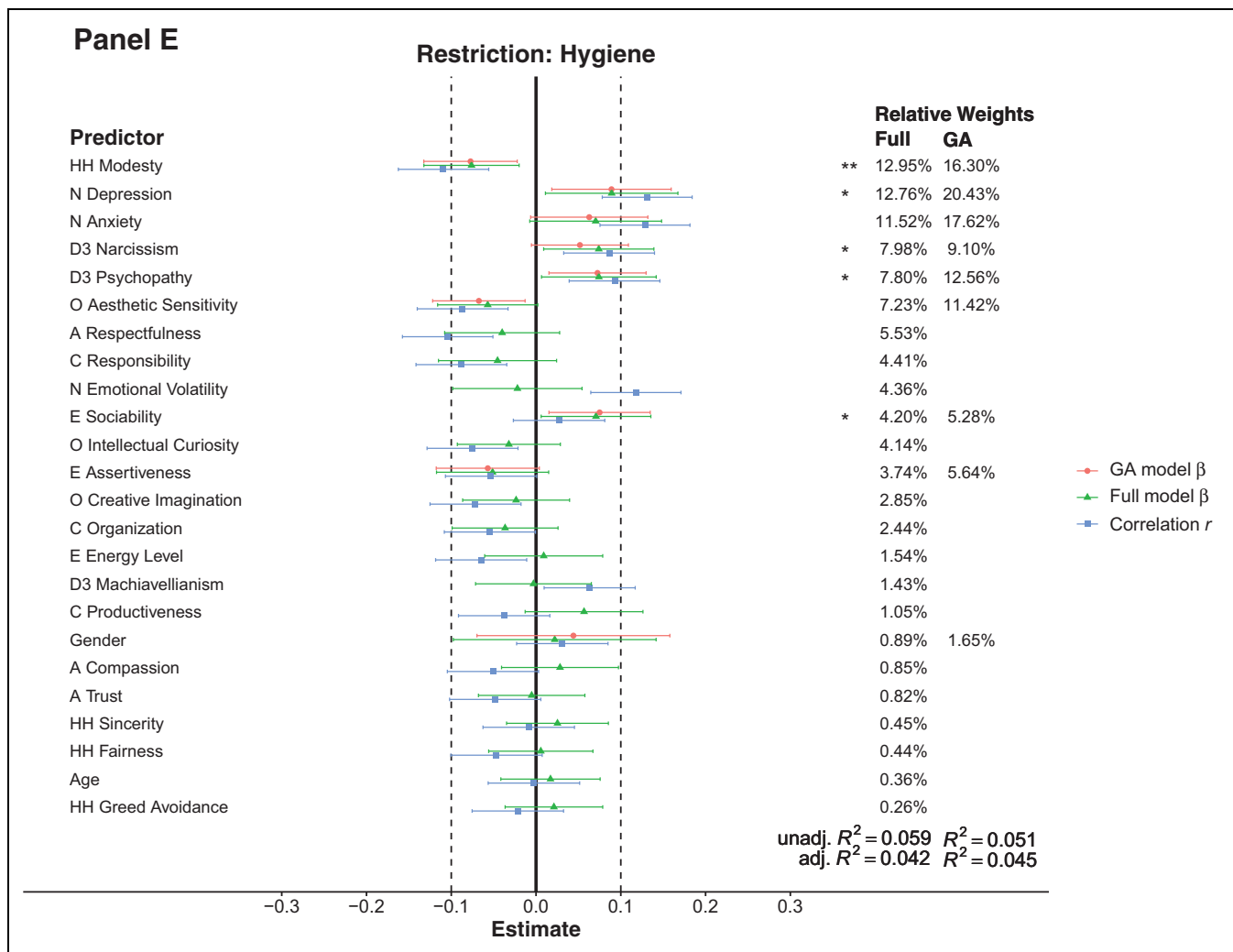
Figure 1. (continued).

attributed to a given predictor). This allowed ranking all 24/25 predictors according to their relative importance. Additionally, we utilized GAs to optimize the prediction of each outcome with a parsimonious set of predictors. As summarized in Table 5, six to 13 predictors were selected by the GAs. Especially Extraversion Energy Level, Neuroticism Depression, Openness Aesthetic Sensitivity and Creative Imagination, and gender consistently emerged as relevant predictors of outcomes, each being included in at least seven of the 10 GA-optimized models. In a second step, βs and RWs were also computed for the GA-optimized LMs to rank-order only the GA-selected predictors in terms of relative importance.

To facilitate an overview of all findings, we compiled figures for each outcome. Figure 1 features the eight protective measure domains (Panels A–H), Figure 2 general negative appraisal, and Figure 3 subjective well-being. Each figure displays the 24/25 predictors ranked in terms of their RWs from the regular LM in descending order, from most to least important. RWs are given in percentage of totally explained variance (R^2). RWs of GA-optimized model predictors appear beside full model RWs.

To facilitate comparisons, full model βs (green triangles) and GA-optimized model βs (red dots) as well as zero-order correlations from Table 4 (blue squares) are depicted, each along with their respective 95% confidence intervals. Lastly, asterisks for traditional NHST *p* values are also included. Together, these figures show at one glance how correlations, full LMs, and GA-optimized LMs estimated the associations between person variables and psychological outcomes during the COVID-19 pandemic. Thus, *consistent* patterns of findings, as well as divergences, are more easily detected. Detailed output for each analysis is available at https://osf.io/5nvgz/.

In the prediction of the *eight protective measure domains*, the GAs suggested optimized models with six (Travel) to 13 predictors (Retail/Services). In terms of variance explained, Leisure/Gatherings (full model: 12.83%; GA-optimized: 12.58%) and Companionship (full model: 12.56%; GA-optimized: 12.88%) were explained best and Children worst (full model: 3.73%; GA-optimized: 3.77%) by their respective predictor sets. Patterns of findings seemed to generalize mostly across correlation- and regression-based analyses. As can be
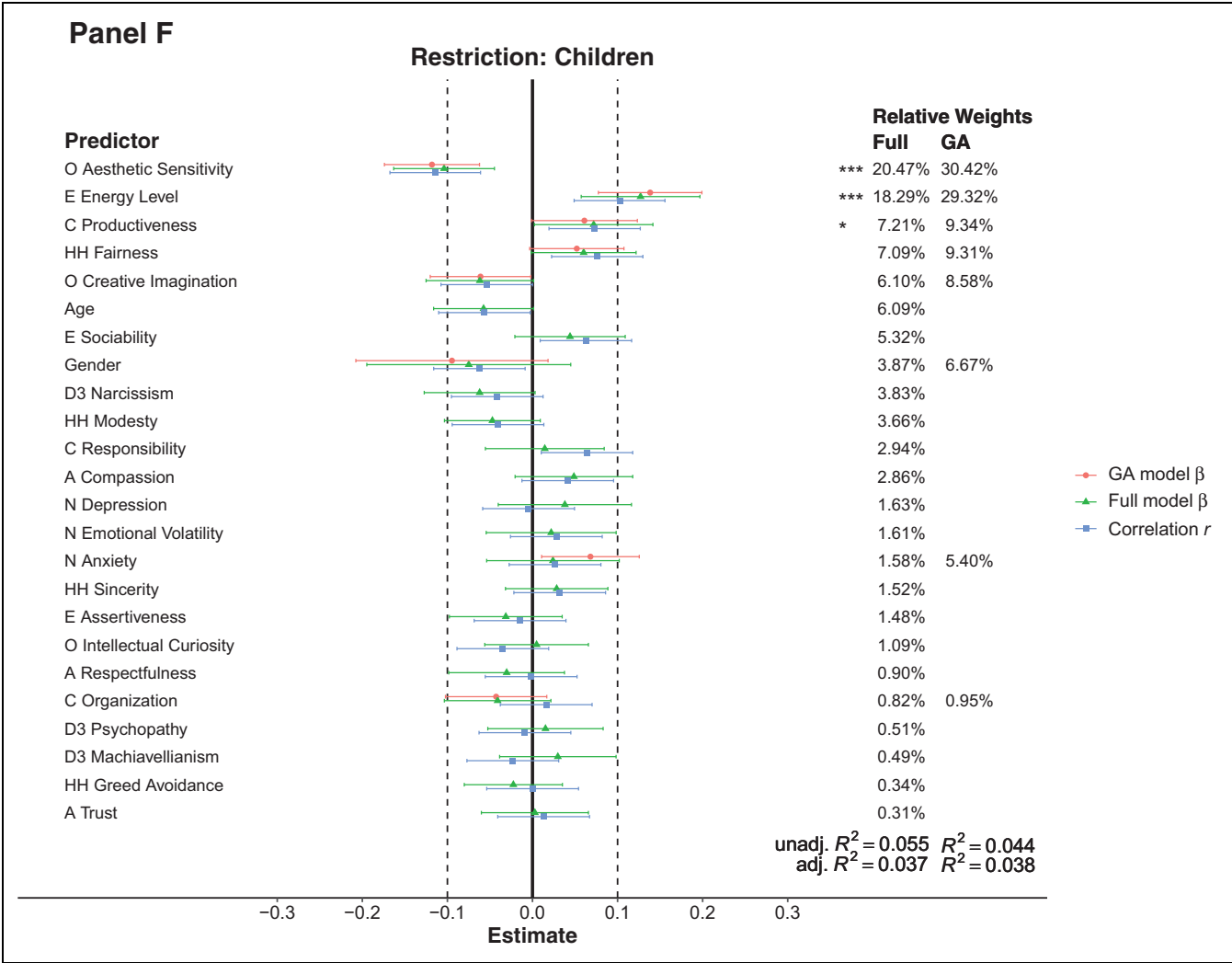
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seen in Figure 1, among the most relevant and important predictors across all measure domains were especially Extraversion Energy Level and Sociability, Neuroticism Depression, and Openness Aesthetic Sensitivity. Age and gender also emerged as important predictors.

In the prediction of *general negative appraisal*, the GA suggested an optimized model with 11 predictors explaining 9.01% of variance (vs. full model with 24 predictors: 8.82%)[9] with Psychopathy alone contributing 24.96% and Neuroticism Depression 17.00% to the total variance explained (see Figure 2). Other relevant and important predictors were Extraversion Energy Level, (low) Agreeableness Respectfulness, (low) Honesty-Humility Fairness and Modesty, (low) Openness Aesthetic Sensitivity, and gender (more negative appraisal by males). Patterns of findings seemed to generalize mostly across correlation- and regression-based analyses (with few exceptions, e.g., for Energy Level, Emotional Volatility, and Machiavellianism).

In the prediction of *subjective well-being*, the GA suggested an optimized model with only eight predictors explaining 27.87% of variance (vs. full model with 25 predictors: 28.07%). Patterns of findings differed somewhat across correlation- and regression-based analyses: While the rank ordering of variables was mostly preserved, correlations yielded much higher effect sizes. As can be seen in Figure 3, the by far most relevant and important predictors were all three Neuroticism facets (i.e., higher Neuroticism predicted lower well-being) which together contributed 94.54% to the total variance explained by the GA-selected predictor subset.

Discussion

Summary and Interpretation

The current study showed in a large and diverse German sample that psychological consequences during the COVID-19 pandemic are coherently associated with other person-level variables, most notably personality traits. Especially facets of Extraversion (Sociability, Energy Level), Neuroticism (Depression, Anxiety), and Openness (Aesthetic Sensitivity)
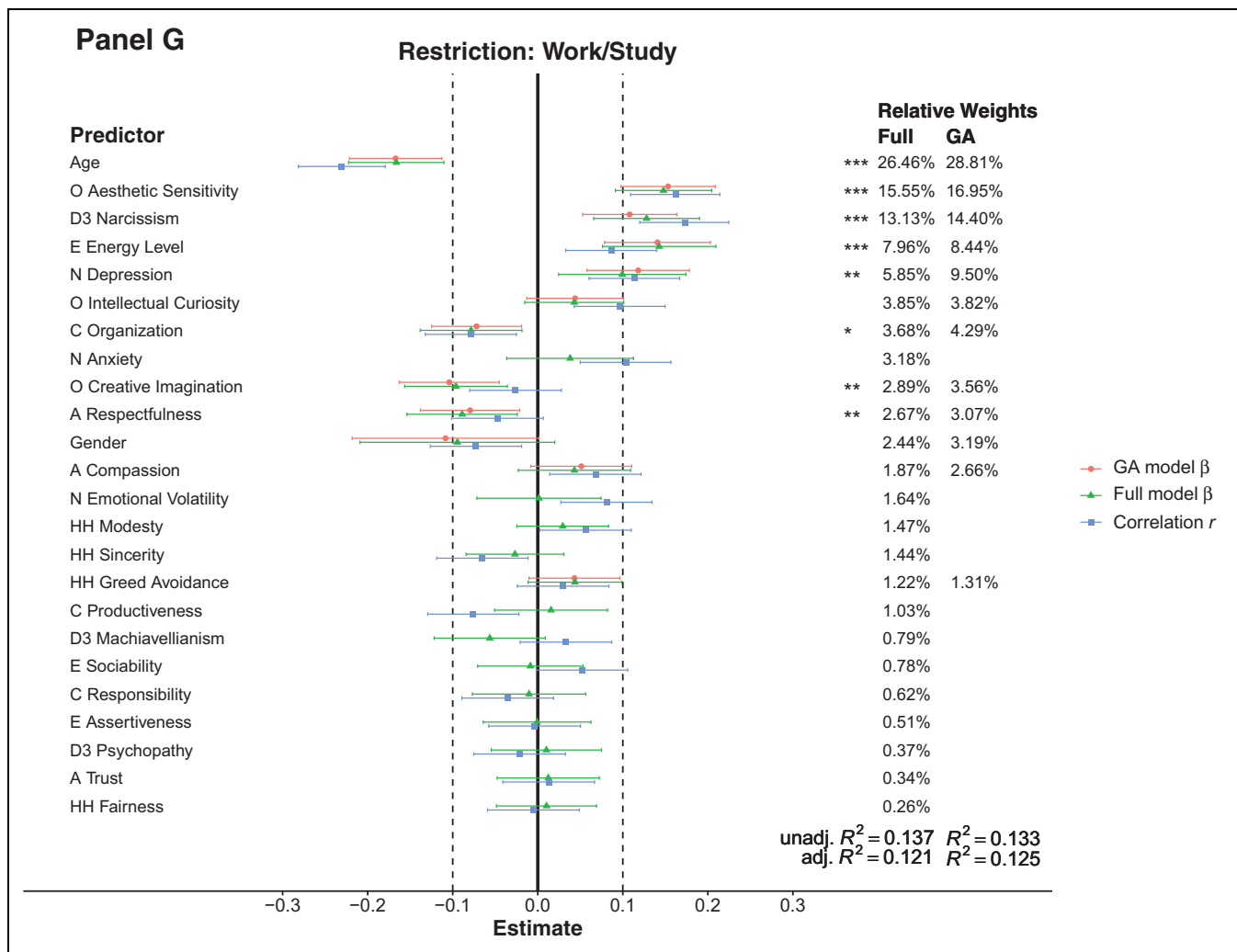
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emerged as the strongest and most important correlates and predictors of most psychological outcomes. Higher scores on these Extraversion and Neuroticism facets meant, on average, finding implemented measures more restrictive and having more negative appraisals of the crisis. For Openness Aesthetic Sensitivity, the direction of associations with perceived restrictiveness varied across measure domains but higher scores meant less negative appraisal. Higher scores on Neuroticism facets and especially on Depression were associated with less subjective well-being (see Kroencke et al., 2020).

Interestingly, these facets were often all at once independent predictors of the same outcomes. This, however, may be expected when outcome variables are broad and heterogeneous. Further, among the Dark Triad traits, Machiavellianism never emerged as an important predictor, while Narcissism and to some extent Psychopathy did sometimes (e.g., in the prediction of general negative appraisal) but generally less than Big Five traits. Lastly, age and gender were also important

predictors but often with smaller effect sizes than those from personality traits. Thus, traits showed substantial effects *independent of* and *beyond* basic sociodemographic variables. Together, these findings suggest that not everyone is impacted equally by the crisis and thus add to the burgeoning literature on the importance of considering individual differences during the COVID-19 pandemic (see cursory review in "Background" section).

Limitations and Prospects

There are some limitations and constraints on generality (Simons et al., 2017) that suggest future directions that may corroborate and extend our findings. First, the cross-sectional design cannot reveal temporal dynamics. Longitudinal data can track within-person changes and interindividual differences therein, which could be explained by personality traits (e.g., Extraversion facets predicting changes in subjective well-being across the pandemic).
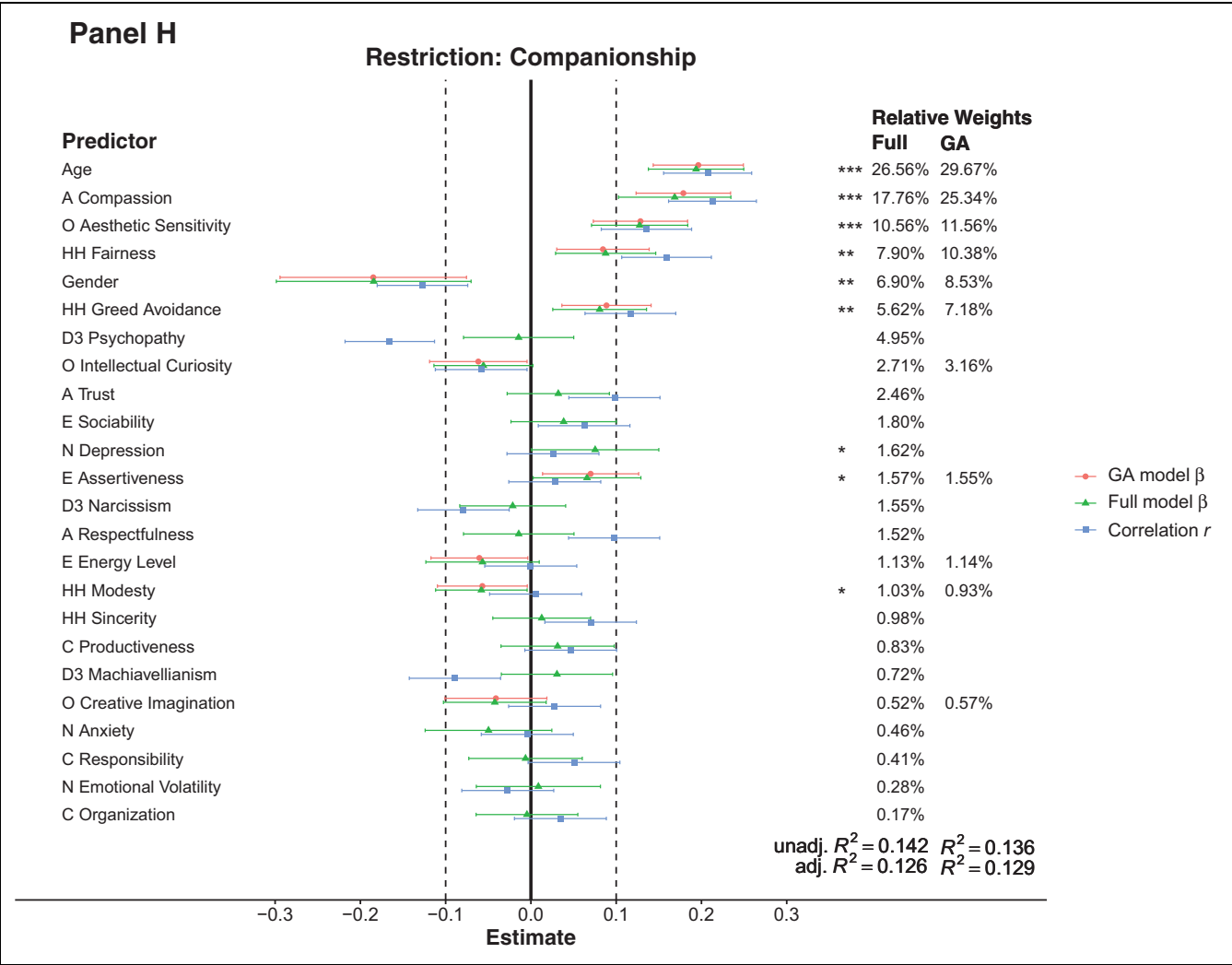
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Second, our findings suffer from common method/source variance as we used only self-reports. Self-reports are appropriate to study the cognitive-affective outcomes we were interested in. However, personality traits would be best examined using multiple data sources (e.g., peer reports, experience-sampling measurements), but it was not possible to incorporate these into a short online survey.

Third, predictors (especially facets) and outcomes differed in their internal consistencies which may obfuscate head-to-head comparisons between effect sizes (Braun et al., 2019). Notably, internal consistencies are expected to be lower for short scales, and those of Big Five facet measures in the current study are comparable to previous research that also demonstrated high retest reliabilities for the same scales (Rammstedt et al., 2018). Further, internal consistencies are usually lower than retest reliabilities (McCrae et al., 2011) and probably less relevant to the validity of a scale (McCrae et al., 2011, McCrae & Mõttus, 2019)

Fourth, there is an ongoing debate of what partial effects mean and whether they should be interpreted at all. For

example, what does a residual narcissism score capture once other predictors (e.g., Machiavellianism, Psychopathy, Honesty-Humility) are "controlled for"? There is literature suggesting that partial effects from multiple regressions should not or cannot be interpreted (e.g., Dark Triad literature: Sleep et al., 2017; Vize et al., 2018), while other literature routinely makes uses of partial effects (e.g., network literature: Epskamp & Fried, 2018) or provides cautious interpretations (e.g., Furnham et al., 2013). For readers who eschew interpreting partial effects (βs in Figures 1–3), the current study provides several alternatives:[10] Table 4 features the zero-order correlations that do not suffer from these problems. Additionally, we report the RW of each predictor (Figures 1–3; columns on the right) which represents its total contribution to prediction of the outcome, considering both its unique partial contribution and the contribution it shares with other predictors (Johnson, 2000; Nimon & Oswald, 2013). Further, the ICOMP criterion used for GA-based subset selection directly penalizes covariance complexity (Bozdogan, 2004), which facilitates the interpretation of partial effects in GA-optimized models (Figures 1–3; in
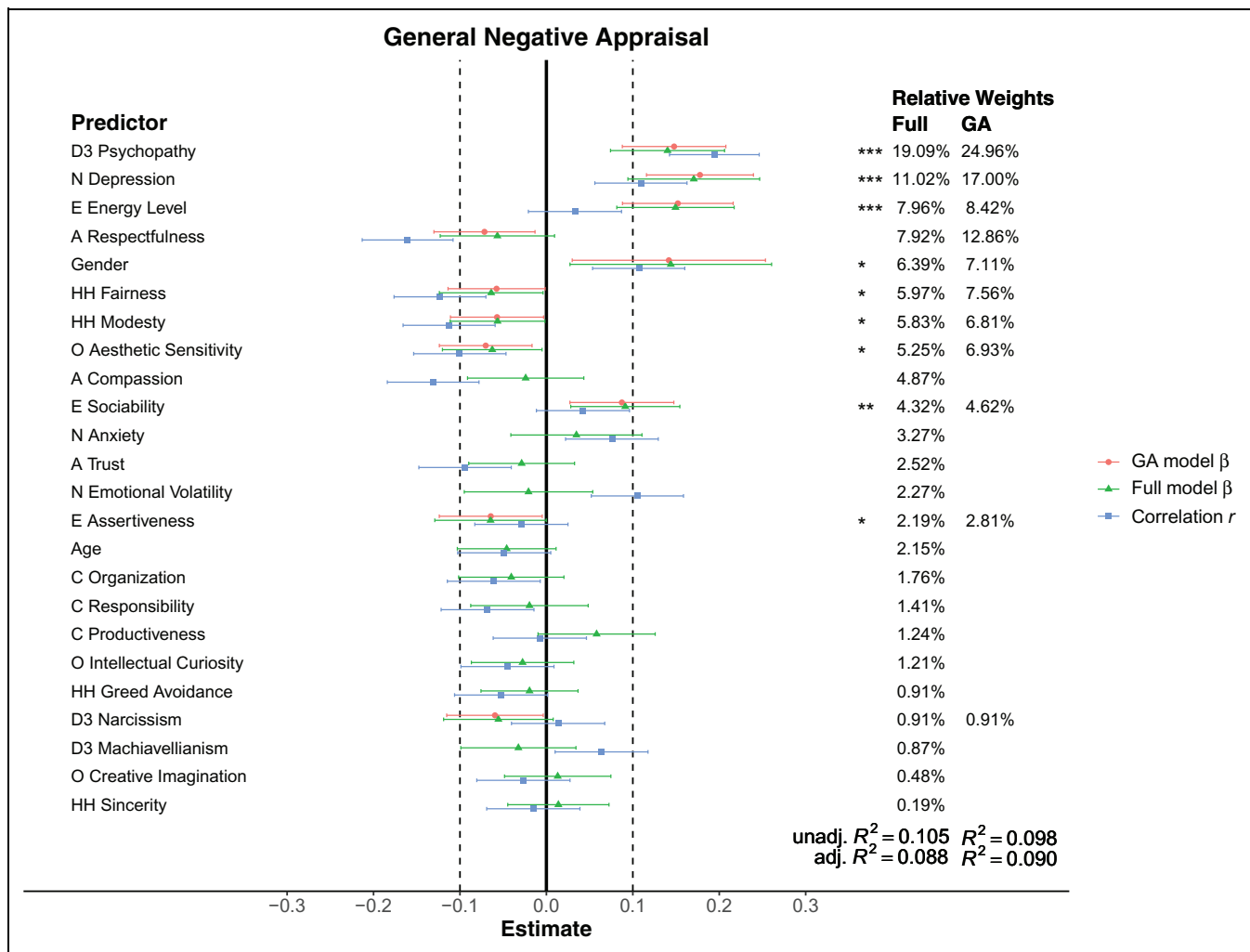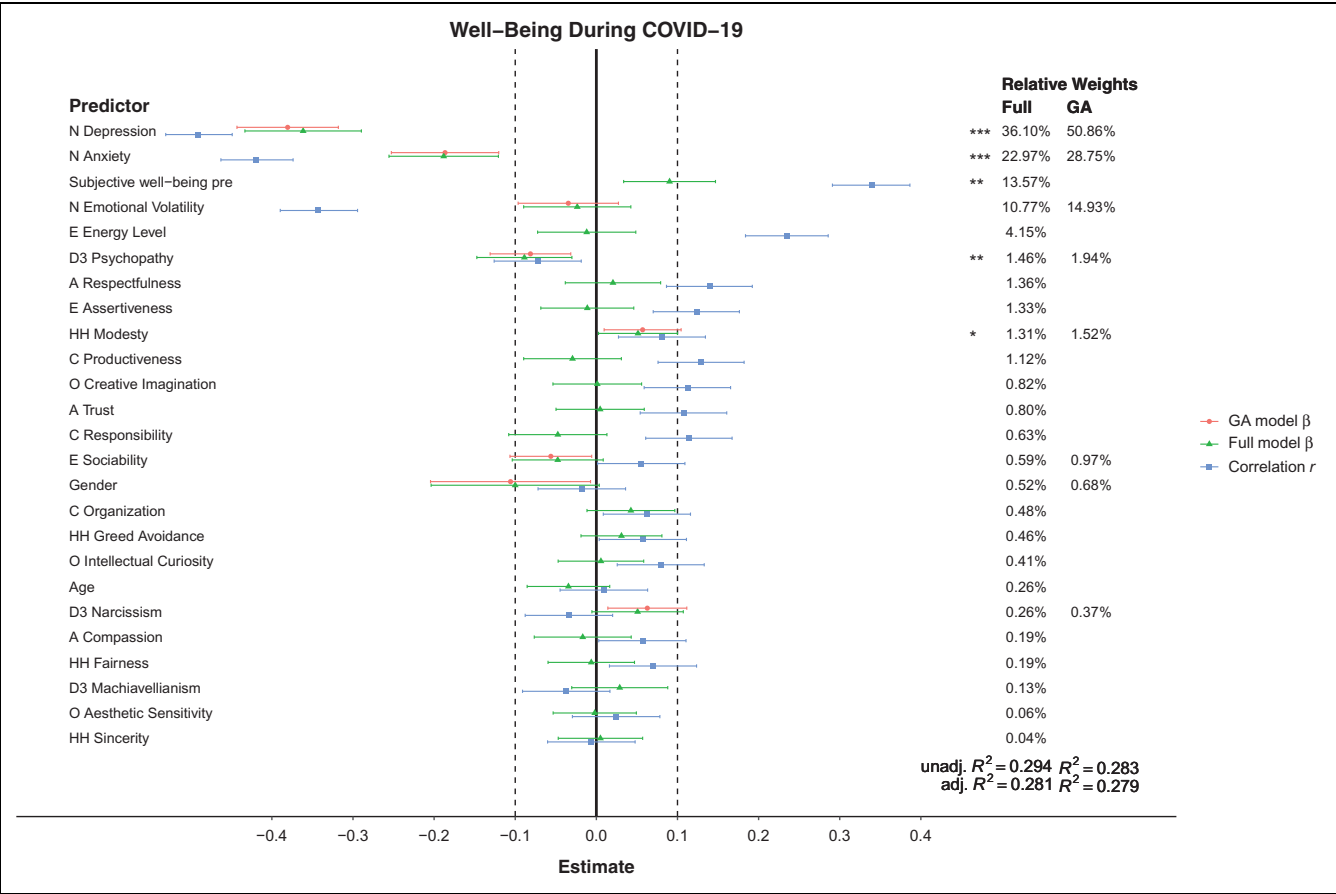
Figure 2. Prediction of general negative appraisal. *Note. N* = 1,320. Depicted are βs for all predictors in the full model (green triangles) and the predictor subset of the GA-optimized model (red dots) as well as zero-order Pearson correlations (blue squares), along with their respective 95% confidence intervals. Regression weights (βs) have been standardized; except for gender (with 0 = *female*, 1 = *male*). Predictors are sorted in descending order according to their relative weights in the full model. Relative weights are given for the full LM and the GA-LM as % of totally explained variance in the outcome (unadjusted R^2) that can be attributed to each predictor in the model. E = Extraversion; A = Agreeableness; C = Conscientiousness; N = Neuroticism; O = Openness; D3 = Dark Triad. unadj. R^2 = unadjusted R^2; adj. R^2 = adjusted R^2. */**/*** Indicate full model β is statistically significant at p < .05/.01/.001.

red dots). Notably, correlation- and regression-based findings strongly converged and yielded replicable results for most analyses (cf. Figure 3).

Fifth, our German sample was large and reasonably diverse, but not population-representative due to our online recruitment strategy (e.g., we do not know how the Facebook ad algorithm may have biased the sample). Thus, it is unclear to what extent findings generalize across the entirety of Germany. Moreover, of course, our findings await replication in other countries with different implementations of protective measures, economies, and cultural backgrounds. COVID-19 experiences are likely influenced by numerous sociocultural factors such as typical living situations, the labor market, government support, the general political climate, and many more.

Lastly, some have argued that personality psychology has policy relevance (Bleidorn et al., 2019), while others cautioned that psychological science is not yet ready to provide insights that may actually be helpful for crises (IJzerman et al., 2020; but see Van Bavel et al., 2020), such as the COVID-19 pandemic. Of course, we do not think that our findings can or should be immediately translated into policies; rather, it was our aim to start building knowledge on individual differences in consequences of the COVID-19 pandemic. Our research shows that not everyone is impacted uniformly and that impacts depend on personality. Once cumulative and replicable knowledge is built, the communication of protective measures, laws, and advice could be (better) tailored to recipients' traits and thus instill, increase, or maintain commitment, citizenship, and solidarity.

Figure 3. Prediction of subjective well-being during the COVID-19 pandemic. *Note.* N = 1,320. Depicted are βs for all predictors in the full model (green triangles) and the predictor subset of the GA-optimized model (red dots) as well as zero-order Pearson correlations (blue squares), along with their respective 95% confidence intervals. Regression weights (βs) have been standardized; except for gender (with 0 = *female*, 1 = *male*). Predictors are sorted in descending order according to their relative weights in the full model. Relative weights are given for the full LM and the GA-LM as % of totally explained variance in the outcome (unadjusted R^2) that can be attributed to each predictor in the model. E = Extraversion; A = Agreeableness; C = Conscientiousness; N = Neuroticism; O = Openness; D3 = Dark Triad; Subjective Well-being Pre = retrospectively reported subjective well-being before the implementation of protective measures unadj. R^2 = unadjusted R^2; adj. R^2 = adjusted R^2. */**/*** Indicate full model β is statistically significant at p < .05/.01/.001.

Conclusion

The COVID-19 outbreak represents a global pandemic of unprecedented scale in the last century. Governments are intervening to combat, or slow down, the pandemic. Germany has implemented several measures, laws, and advice, and our study shows that these vary in their perceived restrictiveness and that psychological consequences during the COVID-19 pandemic are dependent upon facets of personality traits, especially of Extraversion, Neuroticism, and Openness. This personality-dependent impact holds even after controlling for basic sociodemographic variables and thus demonstrates the need to consider trait-like individual differences in crisis situations.

Authors' Note

Open Materials, Data, and Code can be found on the Open Science Framework (OSF): https://osf.io/5nvgz/.

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Notes

1. On April 20, some states started loosening restrictions.
2. One rule (a curfew) had only been imposed in some regions. Participants not affected by this rule indicated how restricted they would feel by it.

3. This item was judged as least restrictive among all measures and including it in principal component analyses yielded messier structures.

4. Computing relative weights produces results very similar to those obtained by dominance analyses but is more computationally efficient (Johnson, 2000).

5. For example, due to suppressor effects.

6. This measure had only been imposed in some regions.

7. We only present findings with gender and age included as predictors in order to contrast their effects to those of personality variables.

8. Analyses predicting individual appraisals are available at https://osf.io/5nvgz/. Further, as we share code and data, readers may run any analyses they see fit.

9. In the prediction of individual appraisals, the R^2s of GA-optimized LMs ranged from .030 (strictness; full model $R^2 = .028$) to .109 (pessimism-optimism; full model $R^2 = .102$). For details, see https://osf.io/5nvgz/.

10. Commonality analyses (e.g., Nimon & Oswald, 2013) would stringently address the partialization issue but are unfeasible with many predictors.

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