

Predicting compliance with COVID-19 containing measures using context-specific and dispositional individual differences: The particular role of individual's sense of responsibility for collective health

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Abstract

In this research, we examined whether context-specific individual differences would allow for a better prediction of pandemic-related attitudes and behavior than non-specific dispositional traits. In Study 1, we introduced a context-specific measure of individual differences in the sense of responsibility for collective health (SRCH) and compared its ability to predict the acceptance of pandemic-related restrictions, with that of pandemic-related worries considered as a context-specific but self-oriented tendency and with two dispositional traits, i.e., grandiose and vulnerable narcissism. Only SRCH and pandemic-related worries uniquely predicted the acceptance of restrictions. In Study 2, we examined whether SRCH predicted increased hygiene and social distancing during pandemic better than narcissistic traits and pandemic worries, as well as social responsibility personal values—an others-oriented disposition. The results showed that SRCH explained most of the unique variance in social distancing, whereas pandemic-related worries uniquely predicted most of the variance in hygiene practices. Of the dispositional traits, only social responsibility personal values predicted a unique portion of the variance in social distancing, whereas narcissistic traits added no incremental value in predicting any of the precautionary measures. The results of both studies indicate that context-specific individual differences are robust predictors of compliance with COVID-19 mitigating measures.

Keywords: sense of responsibility for collective health; narcissism; pandemic-related worry; social responsibility personal values; acceptance of restrictions; social distancing; hygiene

1. Introduction

The outbreak of the COVID-19 pandemic has affected lives of millions of people on all continents and posed many challenges due to its rate of spread, its mortality rates, and the uncertainty about its infection.

There is evidence that the SARS-CoV-2 virus can be transmitted by asymptomatic carriers (Bai, et al., 2020) and that the infected individuals may undergo the illness while experiencing only mild symptoms (particularly in patients younger than 60 years of age; Jordan, Adab, & Cheng, 2020). Thus, if people adopt precautionary measures based solely on an assessment of their health, they may contribute to the spread of the SARS-CoV-2 virus and expose those who are more vulnerable.

According to health experts (Kraemer et al., 2020; Kissler, Tedijanto, Lipsitch, & Grad, 2020; Engle, Stromme, & Zhou, 2020), the role of self-limiting behavior is crucial to mitigating the effects of the COVID-19 pandemic. This means that only if people decide to give up some of their freedoms to protect others can the spread of the disease be limited (see Jetten, Reicher, Haslam, & Cruwys, 2020).

Although the current pandemic is a problem for every collective affected by the virus, it is individuals who are substantially responsible for protecting themselves and others from infection. Thus, the current situation has created a necessity to identify psychological factors that can help predict compliance with the recommended precautionary measures (Bavel et al., 2020; Holmes et al., 2020). Personality and social psychology scientists are contributing to this endeavor by studying personality dispositions and more context-specific variables, such as perception, attitudes, and beliefs, which can predict health-related behavior. To date, several predictors of accepting and endorsing health-protective behaviors that may reduce the spread of COVID-19 have been identified. Among them are personality traits, including both adaptive traits, such as the traits included in the Five-Factor Model, and maladaptive traits, such as the dark triad of personality factors (Blagov, 2020; Miguel, Machado, Pianowski, & Carvalho,

2021; Zajenkowski, Jonason, Leniarska, & Kozakiewicz, 2020). The more context-dependent individual differences include measures such as personal fear of COVID-19 (Harper, Satchell, Fido, & Latzman, 2020; Mertens, Gerritsen, Duijndam, Salemink, & Engelhard, 2020; Taylor, Landry, Paluszek, & Asmundson, 2020), personal values of social responsibility or self-interest (Oosterhoff & Palmer, 2020), personal beliefs about the way the virus spreads (Clark, Davila, Regis, & Kraus, 2020), beliefs about the effectiveness of the recommended precautions (Clark et al., 2020), and conspiracy beliefs concerning the pandemic (Allington, Duffy, Wessely, Dhavan, & Rubin, 2020).

As seen from some the results, the prediction of compliance with health-protective recommendations or the acceptance of restrictions seems to be more effective based on more contextual measures of individual differences than on dispositional traits. For instance, in a study by Clark and colleagues (2020), beliefs about whether precautions are effective in preventing the virus spread turned out to be a considerably stronger predictor (assessed by semipartial correlations) of actually taking health precautions than extraversion and consciences. In a study by Zajenkowski et al. (2020), personality variables provided no additional variance of compliance with pandemic restrictions over and above more specific beliefs concerning the pandemic. In a study by Nowak et al. (2020), personality traits were only linked to preventive behavior by numerous beliefs concerning the perception of the current pandemic.

These observations are congruent with the socio-cognitive approach to personality, which underscores the idea that personality factors alone can predict concrete behavior in a limited way, as such behavior remains under the influence of specific circumstances (Bandura, 2012; Caprara, Barbaranelli, Pastorelli, & Cervone, 2004; Michel & Shoda, 1995).

For these reasons, we believe that context-specific individual differences, such as personal beliefs, attitudes, or an individual's perception of the situation, are a valuable addition to explaining people's reactions during the COVID-19 pandemic, extending beyond the more general measures of personality and other dispositional traits. In addition, the identification of such context-related measures as predictors of behavior endorsed in specific circumstances has a significant application value, as beliefs or attitudes—for obvious reasons—are more malleable than dispositions. Therefore, they can provide grounds for planning social communication campaigns and actions aimed at encouraging people to adopt certain behaviors that serve pandemic suppression.

1.1 Focusing on others (the collective) or on the self during pandemic

When developing their personal approach to a pandemic, people may focus more on protecting their own health or more on protecting the group to which they belong (including own health). Both kinds of orientations may have important implications for compliance with protective behaviors during a pandemic.

Some studies on reactions to the COVID-19 pandemic highlight the role of an individual's interest in the collective good by facilitating compliance with pandemic-mitigating rules. In a study by Oosterhoff and Palmer (2020), greater social responsibility among adolescents in the United States was associated with their stronger tendency to use more disinfectant, whereas valuing their own self-interest over others was associated with less social distancing. Similarly, in a study by Leary, Dvorak, De Leon, Peterson and Troop-Gordon (2020), among concerns over COVID-19 infection, the only concern about infecting others turned out to be associated with social distancing practices.

However, Wise, Zbozinek, Michelini, Hagan and Mobbs (2020) found that engagement in health-protective behaviors (social distancing and frequent hand-washing) was best predicted by the perceived probability of being personally infected, rather than the possibility of transmitting the disease to others. In another study, the fear of being ill turned out to be a

significant predictor of health-related behavior (enhanced hygiene and social distancing; Harper et al., 2020). These studies indicate the role of the tendency to protect oneself during a pandemic as an important factor in facilitating compliance with COVID-19-mitigating rules.

The dark triad of personality factors, which indicate a high focus on oneself and one's own interests (i.e., narcissism, Machiavellianism and psychopathy) were negatively related to the endorsement of health-related behavior (Blagov, 2020; Zajenkowski et al., 2020) but in one study (Nowak et al., 2020), preventive behavior during the current pandemic was not directly related to the dark triad traits. These findings may indicate that the tendency to protect oneself against the virus (such as fear of the coronavirus) can facilitate compliance with health-protecting measures, whereas concentration on the self, stemming from personality dispositions, does may be related to health-protecting in various manner.

1.2 The sense of responsibility for collective health

A review of the existing studies on the predictors of compliance with pandemic-mitigating behavior led us to conclude that there is a lack of a context-specific measure that indicates the level of focus on collective health during a pandemic. Therefore, in this paper, we propose the concept of a sense of responsibility for collective health (SRCH) with an accompanying scale to predict both the acceptance of pandemic restrictions and compliance with pandemic-related preventive measures recommended by health experts (e.g., social distancing, frequent hand washing, using hand sanitizers, mask wearing).

We developed this concept based on the analysis of the specific circumstances posed by the COVID-19 pandemic. As previously noted, according to health experts, the SARS CoV-2 virus is easy to spread, and people may transmit the virus even without having symptoms (Bai, et al., 2020). These people may pose a danger for others while being unaware of the potentially fatal consequences of their behavior. Therefore, to consistently adopt health-protecting behaviors, a person should feel concerned about the welfare of their community. This kind of approach demands thinking in terms of “we” rather than in terms of “I”, indicating that people perceive the situation from the perspective of other people living in the same collective rather than their own personal identity (see: Tajfel & Turner, 1979). Accordingly, Drury (2012) pointed out that people facing an emergency or a disaster tend to come together, both psychologically and behaviorally. He argued that sharing a “common fate” is followed by spontaneous feelings of “togetherness”. Therefore, the emergence of a stronger social identity (with the collective they actually belong to) in the time of the COVID-19 pandemic could make people concerned for others and arouse their feeling of responsibility for protecting the health of members of the community (including oneself). Previous studies have shown that the feeling of personal responsibility can increase one’s motivation to personally engage in social endeavors such as volunteering, helping others, and performing responsibilities to the best of one’s ability (Anderson & Cunningham, 1972; Berkowitz & Daniels, 1964).

We introduce SRCH to describe an individual's mental approach to the current pandemic. This approach consists of feeling personally concerned with collective health and feeling obliged to contribute to protecting it during a pandemic. This kind of *civic* approach to a pandemic assumes the focus of the individual on the collective (i.e., other people) rather than solely on the self.

1.3 Current studies

The main goal of our studies was to examine the role of individual differences in SRCH in the prediction of compliance with COVID-19-containing measures. We also wanted to examine whether the measure of SRCH, which reflects an others-oriented approach to the current pandemic, would explain more variance in health-protecting attitudes and behavior than individual variables indicating a strong orientation towards the self, both being specifically related to the current pandemic (such as worries about the consequences of being personally infected with COVID-19), or dispositional traits (such as grandiose and vulnerable narcissism). We also wanted to compare the predictive power of SRCH with an others-oriented disposition represented by social responsibility personal values.

For these aims, we designed two studies to investigate the role of self- or others-oriented individual tendencies in the prediction of the acceptance of pandemic restrictions (Study 1) or compliance with precautionary measures mitigating the pandemic, i.e., practicing social distancing and increased hygiene (Study 2).

2. Study 1

In this study, we wanted to develop and verify a scale designed to measure SRCH and to answer the question of whether SRCH is related to the level of acceptance towards pandemic-mitigating restrictions. We expected that the individual differences in SRCH would better predict the acceptance of restrictions than would self-oriented individual differences or dispositional traits. We assumed that people who are less likely to perceive the pandemic as a

collective problem (i.e., those who are highly oriented towards the self) would support actions directed at bettering the situation of the group to a smaller degree.

As a self-oriented individual differences variable specifically related to the current pandemic situation, we chose anxiety-related feelings of possible consequences of contracting COVID-19. We also included grandiose and vulnerable narcissism as nonspecific dispositional traits indicating a high orientation towards the self. In the case of pandemic-related anxieties, orientation towards the self manifests directly in the emotions and worries about one's own or close other's health and the deterioration of one's material situation. In the case of grandiose and vulnerable narcissism, self-focus manifests as a general tendency to concentrate on the self and treating one's own needs as more important than the needs of others (Miller et al., 2011).

2.1 Method

2.1.1 Participants and procedure

We recruited 551 participants from Polish community sample (308 women) registered at the online Ariadna Research Panel. We screened the data for automated and invalid responses before testing the hypotheses. Data from participants who completed the study in less than five minutes were excluded from the analysis. Then, we analyzed the data and eliminated unreliable responses (automated, repeated responses). The total number of subjects qualified for the calculation stage was 505 participants (285 women). According to the post hoc power analysis calculated with *G*Power* software (Faul, Erdfelder, Buchner, & Lang, 2009), the sample was sufficient to detect an effect size of 0.145 with an error probability of $\alpha = 0.05$ (an actual power of 0.9502 would require a sample of 506 participants). The participants were asked to provide their age with regard to five age bands (20-24, 25-34, 35-44, 45-54, and 55+). Thirty-two percent of the participants were older than 55 years, 33% were aged 35-54 years and 35% were aged 20-34 years. Of the respondents, 61% reported working full time; 30.4% reported being unemployed, retired, or unable to work for health reasons; and 8.6% reported being students or earning occasional income. Of the participants, 41.3% reported having a

higher education (bachelor's degree or higher). Regarding the place of residence, the majority of the respondents (70.6%) lived in a city, among whom 17.6% lived in a city of over 500 thousand residents. A total of 37.4% of the participants lived with a child (or children) who was (were) under 18 years of age. All the participants were rewarded with points exchangeable for gifts from the Ariadna research panel rewards program.

The study took place between the 25 March 2020 and 1 April 2020, when the government introduced the first wave of restrictions in the form of extensive lockdown. The government introduced a ban on movement, except for professional activities and essential life activities. People were forbidden to gather in a group of more than 2 people, and restrictions on public transport were introduced.

All data collection procedures were reviewed and approved by the ethics committee of [details deleted to maintain the integrity of the review process]. The participants were invited to take part in the study via an e-mail that included a brief description and a link to the survey. They were informed that their participation was voluntary and anonymous. After reading the instructions and providing informed consent, the participants completed a demographic details survey and a series of questionnaires.

2.1.2 Measures

2.1.2.1 Sense of Responsibility for Collective Health Questionnaire (SRCHQ)

The SRCHQ was developed to measure individual differences in the sense of responsibility for collective health (SRCH) based on the construct of SRCH presented earlier in this paper. A high result score on the SRCHQ means that one has a strong tendency to feel concern for their community in the time of a pandemic and to adopt personal responsibility for pandemic suppression.

Initially, the SRCHQ consisted of 6 items. After analyzing the scale's internal consistency and the item-rest correlations, we decided to exclude two items from the scale. Before removing those two items, the Cronbach's α was 0.71, and the lowest item-rest

correlation was 0.22, which we found unacceptable. According to the reliability analysis we conducted on the shortened scale, the Cronbach's α for the 4-item scale was 0.77, and item-rest correlations ranged from 0.46 to 0.71. The resulting 4-item scale was tested with a confirmatory factor analysis. The one-factor solution demonstrated a good fit of the data ($\chi^2=2.93$, $df=2$, $p=0.231$, CFI=0.999, TLI=0.996, RMSEA=0.03).

The final version of the SRCHQ consisted of the following statements: *I am afraid that when I get sick, I may contribute to the deterioration of the health situation in my environment; It is very important for me not to infect others if I become infected with the new coronavirus (SARS-CoV-2); In the current epidemiological situation, everyone is obliged to take care of the health and safety of others, even strangers; It is important to follow the recommendations in force in the country so as not to infect others.* The participants responded to those statements on a scale ranging from 1 - *definitely no* to 5 - *definitely yes*.

2.1.2.2 Pandemic-Related Worries Survey (PRWS)

The PRWS measures individual differences in the level of anxiety of experiencing COVID-19 either personally or through someone close and of the possible deterioration of one's material status or quality of life due to the pandemic. The PRWS ($\alpha = 0.81$) consists of 8 sentences constituting two subscales. The health worries subscale ($\alpha=0.82$) describes worries and anxieties about contracting the disease (e.g., *The thought that I could get sick with the coronavirus disease (COVID-19) makes me anxious*). The material worries subscale ($\alpha=0.78$) describes the consequences of the disease for the participant's material situation (e.g., *I am afraid that my own earnings may decrease significantly as a result of the pandemic*). The participants were asked to respond to the statements on a 5-point scale ranging from 1 *to a very small extent* to 5 *to a very large extent*.

2.1.2.3 Narcissistic Personality Inventory (NPI)

To measure grandiose narcissism, which is understood as a personality trait, we used the Polish adaptation of the Narcissistic Personality Inventory (Raskin & Hall, 1988) by

Bazińska and Drat-Ruszczak (2000). The Polish version of the NPI consists of 34 items (e.g., *I like to look at my body*), which are grouped into 4 subscales: demand for admiration, vanity, self-sufficiency, and leadership. The participants responded to what extent the sentences reflect the way they perceive themselves on a 5-point scale ranging from 1- *is not me* to 5 - *it is me*. Higher total scores indicate stronger grandiose narcissism tendencies. In this study ($\alpha = 0.95$), we used the participants' total scores to measure grandiose narcissism.

2.1.2.4 Hypersensitive Narcissism Scale (HSNS)

We used the Polish translation of the Hypersensitive Narcissism Scale (HSNS; Hendin & Cheek, 1997) to measure the respondents' vulnerable narcissism as a personality trait. The scale consists of 10 items (e.g., *I easily become wrapped up in my own interests and forget the existence of others*) to which participants responded using a 5-point scale ranging from 1 *strongly disagree* to 5 *strongly agree* ($\alpha = 0.81$).

2.1.2.5 Restrictions Acceptance Survey (RAS)

The RAS ($\alpha = 0.91$) was created for the purpose of this study to measure the participants' acceptance of numerous limitations and restrictions related to social functioning. The scale consists of eight such limitations (e.g., *closing schools and kindergartens, the prohibition of gatherings*). The participants responded by assessing their opinion about each restriction on a scale ranging from 1 - *definitely unnecessary and excessive* to 5 - *definitely needed and important*.

2.2 Results

Because the variable distribution of the SRCHQ and the Restrictions Acceptance Survey (RAS) did not meet normality assumptions (skewness -2.19 and kurtosis 6.94 for SRCHQ; skewness -2.61 and kurtosis 8.98 for RAS), we applied nonparametric tests in further analyses.

First, we calculated differences in SRCHQ levels with regard to sex, age, education level, place of residence, and parental status. The Kruskal-Wallis test showed differences in

SRCHQ split only by gender and parental status. The level of SRCH was significantly higher among women ($M = 18.81$, $SD = 1.57$) compared to men ($M = 17.94$, $SD = 2.56$; $\chi^2 = 14.7$, $df = 1$, $p < 0.001$, $\varepsilon^2 = 0.029$). It was also significantly higher among parents ($M = 18.72$, $SD = 1.81$) compared to nonparents ($M = 18.26$, $SD = 2.24$; $\chi^2 = 7.32$, $df = 1$, $p < 0.01$, $\varepsilon^2 = 0.014$), but the effects were relatively weak. The other demographic characteristics (age, place of residence, and education level) did not differentiate the participants' level of SRCH.

To analyze the relation of SRCH and the self-focused variables with restrictions' acceptance, we calculated Spearman's rho zero-order and partial correlation coefficients, which are presented in Table 1.

Table 1

Spearman's rho zero-order correlations between all the measures included in the study and partial correlations between Restrictions Acceptance Survey (RAS) and all predictors' measures.

| | <i>M</i> | <i>SD</i> | 1 | 2 | 3 | 4 | 5 | 6 | 1 partial correlation |
|---------------------------|----------|-----------|---------|---------|---------|---------|--------|------|-----------------------------|
| 1. RAS | 4.68 | 0.53 | — | | | | | | — |
| 2. SRCHQ | 4.61 | 0.52 | 0.52*** | — | | | | | 0.38*** |
| 3. Health Worries Scale | 4.13 | 0.75 | 0.40*** | 0.64*** | — | | | | 0.10* |
| 4. Material Worries Scale | 3.36 | 0.91 | 0.15*** | 0.29*** | 0.41*** | — | | | -0.03 |
| 5. HSNS | 2.92 | 0.67 | -0.05 | -0.02 | 0.11* | 0.26*** | — | | -0.05 |
| 6. NPI | 2.79 | 0.64 | -0.01 | -0.05 | 0.02 | 0.08 | 0.12** | — | 0.02 |
| Cronbach's α | | | 0.91 | 0.77 | 0.82 | 0.78 | 0.81 | 0.95 | |

Note. RAS=Restrictions Acceptance Survey; SRCHQ = Sense of Responsibility for Collective Health Questionnaire; NPI = Narcissistic Personality Inventory; HSNS = Hypersensitive Narcissism Scale;

* $p < .05$, ** $p < .01$, *** $p < .001$

The results showed significant zero-order correlations between both SRCH and pandemic-related worries with the acceptance of restrictions aimed at reducing the spread of the coronavirus. The relationship between SRCH and restrictions' acceptance was higher than that between pandemic-related worries (about one's health and the possible deterioration of one's material situation) and restrictions' acceptance. Similarly, the partial correlation of SRCH and restrictions' acceptance while simultaneously controlling for the effect of remaining predictors (i.e., both of the narcissistic traits and the individual differences in pandemic-related worries) was higher than an analogous partial correlation of pandemic-related worries with restrictions' acceptance. Neither of the narcissistic traits were uniquely related to the acceptance of restrictions.

2.3 Discussion

In the current study, we introduced a concept of context-specific individual differences in the sense of responsibility for collective health, designed to understand an individual's responses to the specific circumstances and challenges posed by the COVID-19 pandemic.

The study showed that the SRCHQ turned out to be a reliable measure that allows the differentiation of participants' acceptance of restrictions introduced to suppress the spread of the coronavirus. At the same time, SRCH was more strongly related to the acceptance of restrictions compared to pandemic-related worries—considered here as context-specific but self-oriented individual differences. These results showed that context-specific individual differences are highly useful predictors of the acceptance of pandemic-related restrictions. At the same time, the observed much stronger association of the sense of responsibility for collective health with acceptance of restrictions than that of pandemic worries indicates, that the focus on collective health is much more important for adopting the health-protecting approach during pandemic than the focus solely on one's own health.

3. Study 2

The aim of Study 2 was to determine whether SRCH is a good predictor of two kinds of behavior that directly affect the spread of the COVID-19 pandemic, i.e., increased hygiene and application of social distancing. According to health experts, compliance with those precautionary measures is crucial for containing the spread of the virus.

As in Study 1, we wanted to assess the predictive power of SRCH compared to pandemic-related worries (as context-specific, others-oriented individual differences) and with grandiose and vulnerable narcissism (as dispositional, self-oriented traits). In this study, we also wanted to examine the role of a dispositional trait indicating a strong orientation towards other people. Therefore, we included the variable of social responsibility personal values, which represents a general values-based foundation of civic engagement (Syvertsen, Wray-Lake, & Metzger, 2015).

We expected that SRCH would better predict the dependent variables than would personal responsibility values due to its context specificity to the pandemic situation. As the current pandemic is a collective problem, we expected that the individual differences in SRCH and social responsibility personal values, both of which are others-oriented individual factors, would better predict health-protective behaviors during the pandemic than pandemic-related worries and narcissistic traits, both of which are self-oriented individual variables.

3.1 Method

3.1.1 Participants and procedure

The necessary sample size was determined based on expectations from a previous study and calculated with *G*Power* software (Faul et al., 2009). For an expected effect size of 0.25 for the correlation analysis and an α error probability of 0.05, the recommended total sample size was 164. The power analysis of a linear regression with 7 variables and 5 predictors, an expected effect size of $f^2 = 0.15$ (medium effect), and an α error probability of 0.05 showed that the recommended total sample size was 138. The number of complete datasets we obtained was larger since a sample usually requires screening, which results in a sample size reduction.

A total of 248 participants from Polish community sample took part in the second study (142 women). The data were obtained via the Ariadna Research Panel. The data provided by 35 participants were excluded due to their short response time (the limit value was completing the survey in a time shorter than 5 minutes) and automated, invalid responses, resulting in a final sample of 213 participants (136 women). A total of 22.5% of the participants were older than 55 years, 36.1% were aged 35-54 years and 41.3% were aged 18-34 years. Of the respondents, 60% reported working full time; 26.7% reported being unemployed, retired, or unable to work for health reasons; and 15% reported being students or earning occasional income. Of the participants, 47.4% reported having a higher education (bachelor's degree or higher). Regarding the place of residence, 73.2% lived in a city, among whom 22% lived in a city of over 500 thousand residents. Fifty percent of the participants lived with a child (or children) who was (were) of under 18 years of age. All the participants were rewarded with points exchangeable for gifts from the Ariadna research panel's rewards program.

The second study took place between 29 April 2020 and 8 May 2020, when the lockdown was withdrawn—forests, beaches and parks were opened and restrictions in some stores were reduced, while citizens were still obliged to wear masks in public spaces. At this time, the course of the virus spread was more dependent on actual social distancing and increased individual hygiene.

The procedure for Study 2 was congruent with that of Study 1, as described above. The respondents were invited to participate in a self-report study by e-mail. All the participants provided informed consent and completed all the supplied questionnaires. The procedures performed in the study were in accordance with the ethical standards of the institutional research committee.

3.1.2 Measures

3.1.2.1 Sense of Responsibility for Collective Health Questionnaire (SRCHQ)

As in Study 1, we also used the SRCHQ ($\alpha = 0.82$) to measure individual differences in SRCH. However, the scale was slightly modified. One item was changed to highlight the "ought self" aspect (i.e., *It is important to follow the recommendations in force in the country so as not to infect others.* was changed to *I believe that I should follow the recommendations in force in the country, as it is important for the containment of the COVID-19 pandemic.*

3.1.2.2 Pandemic-Related Worries Survey (PRWS)

In this study, pandemic-related worries were measured by a shortened version of the PRWS, which included 6 items instead of 8, referring both to the respondents' worry about a possibility of contracting COVID-19 and the worry about the possible deterioration of one's material situation. The results were calculated as a single scale ($\alpha = 0.75$).

3.1.2.3 Hypersensitive Narcissism Scale (HSNS)

As in the first study, to measure vulnerable narcissism, we used the Polish translation of the Hypersensitive Narcissism Scale (Hendin & Cheek, 1997). This time, the Cronbach's α was equal to 0.76.

3.1.2.4 Narcissistic Personality Inventory (NPI-13)

To measure grandiose narcissism, we decided to use a shorter measure. We chose the modified Polish adaptation of the 13-item Narcissistic Personality Inventory (NPI-13; Gentile, et al., 2013; Żemojtel-Piotrowska et al., 2018). The Polish version of the NPI-13 is an abbreviated form of the full version of the NPI-40 (Raskin & Hall, 1988). It is comprised of 13 items, which are indicative of high narcissism and assessed on a 7-point scale ranging from 1 – *I strongly disagree* to 7 – *I strongly agree* (as opposed to the original version, which has a binary system of answers in which the participants choose one of two statements indicating high or low narcissism) ($\alpha = 0.90$).

3.1.2.5 Social Responsibility Personal Values Scale (SRPVS)

To measure social responsibility personal values, we used 3 items from the 4-item Social Responsibility Personal Values Scale (SRPVS; Syvertsen et al., 2015; Flanagan,

Syvvertsen, & Stout, 2007), as this scale is a measurement tool that reflects prosocial engagement. The participants responded to the three items (*It is important to me to consider the needs of other people; It is important to me to make sure that all people are treated fairly; It is important to me to think about how my actions affect people in the future*), on a 5-point scale ranging from 1 – *not at all important* to 5 – *extremely important* ($\alpha = 0.76$).

3.1.2.6 Hygiene Routines Survey (HRS) and Social Distancing Practices Survey (SDPS)

Hygiene routines were measured with a modified and extended survey (Oosterhoff & Palmer, 2020) Hygiene Routines Survey (HRS), describing six behaviors, such as washing one's hands; wearing a protective mask; disinfecting one's mask, hands, and home; and wearing protective gloves (e.g., *I washed my hands for at least 20 seconds after touching objects that could be contaminated by the virus; Being in public space, I made sure that my nose and mouth were covered at all times.*). The participants were asked how often they had performed those behaviors within the previous 7-day period (1-*never*, 6-*always*), $\alpha = 0.73$.

The Social Distancing Practices Survey (SDPS) comprised 8 possible behaviors, including keeping a safe distance, refraining from going to crowded places or supermarkets, refraining from meeting with friends or talking to neighbors, and greeting others without using physical contact (e.g., *I kept a 2-meter distance in public spaces; I greeted people without physical contact*). On a scale ranging from 1 - *never* to 6 – *always*, the participants indicated their frequency of those behaviors within the 7 days preceding the survey ($\alpha = 0.92$).

3.2 Results

The variable distribution analysis suggested a slightly inflated skewness of SDPS (-1.18) and the SRCHQ (-1.03). In this study, we decided to use the Box-Cox transformation (Box & Cox, 1982, Sakia, 1992) so that the theoretical assumptions made in parametric analyses would be better satisfied. As a result, the skewness and kurtosis for all variables were acceptable (< 1 for skewness, < 2 for kurtosis; George & Mallery, 2010), allowing the use of parametric tests.

In the sample, there was a relatively high rate of compliance with social distancing and hygiene routines, but a reasonable level of variance was observable. Correlations between the independent variables and COVID-19-mitigating behavior measures were in the small to moderate range (.19 to .63). We found that there were significant positive correlations between hygiene and social distancing practices with SRCH, SRPV, and pandemic-related worries. Grandiose narcissism was correlated negatively with social distancing practices (Table 2).

Table 2

Pearson's zero-order correlations between all the measures included in the study and partial correlations between Hygiene Routines Survey (HRS) and Social Distancing Practices Survey (SDPS) with all predictors' measures.

| | <i>M</i> | <i>SD</i> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 partial correlation | 2 partial correlation |
|---------------------|----------|-----------|---------|----------|----------|--------|-------|---------|------|-----------------------------|-----------------------------|
| 1. HRS | 3.50 | 0.77 | — | | | | | | | - | 0.41*** |
| 2. SDPS | 5.09 | 0.91 | 0.54*** | — | | | | | | 0.41*** | - |
| 3. SRCHQ | 4.31 | 0.70 | 0.41*** | 0.63*** | — | | | | | 0.25*** | 0.52*** |
| 4. SRPVS | 3.92 | 0.67 | 0.25*** | 0.38*** | 0.44*** | — | | | | 0.10 | 0.15* |
| 5. PRWS | 3.09 | 0.76 | 0.41*** | 0.19** | 0.25*** | 0.07 | — | | | 0.35*** | 0.06 |
| 6. HSNS | 3.09 | 0.55 | 0.02 | -0.05 | -0.07 | -0.11 | 0.18* | — | | -0.01 | 0.01 |
| 7. NPI-13 | 3.21 | 0.99 | -0.13 | -0.23*** | -0.28*** | -0.16* | 0.03 | 0.26*** | — | -0.05 | -0.07 |
| Cronbach's α | - | - | 0.73 | 0.92 | 0.82 | 0.76 | 0.75 | 0.76 | 0.90 | -- | -- |

Note. HRS = Hygiene Routines Survey; SDPS=Social Distancing Practices Survey; SRCHQ = Sense of Responsibility for Collective Health; SRPVQ = Social Responsibility Personal Values Scale; PRWS = Pandemic-Related Worries Scale; NPI = Narcissistic Personality Inventory; HSNS = Hypersensitive Narcissism Scale;

* $p < .05$, ** $p < .01$, *** $p < .001$

In the two separate four stage hierarchical multiple regressions we tested the effects of each of the predictor categories (context-specific/dispositional traits and self-oriented/others-oriented) on social distancing and hygiene (Table 3). First, we wanted to verify whether dispositions account for the unique variance in social distancing and hygiene, therefore we entered narcissistic personality traits (self-oriented, dispositional traits) at stage one of the analysis (Model 1) and social responsibility personal values (others-oriented, dispositional trait) at stage two (Model 2). In the third stage we added a context-specific and self-oriented measure of pandemic-related worries (Model 3). In the final step we included sense of responsibility for collective health (others-oriented, context-specific variable; Model 4) to determine the amount of variance in social distancing and hygiene it additionally explained, over and above the dispositional and self-oriented variables.

The results of the analysis showed significant effects on social distancing of the grandiose narcissism (only at stages one and two), PRWS (only at stage three), SRCH, and SRPV. As indicated by the results of Model 4, SRCH was the strongest predictor of social distancing ($\beta = 0.541$), followed by social responsibility personal values ($\beta = 0.127$). Despite a significant effect at earlier stages of the analysis, PRWS and grandiose narcissism no longer predicted social distancing when SRCH was included in the equation. SRCHQ as a predictor at the final stage of the analysis explained 20.7% of the unique variance in social distancing.

The results of the analogous analysis with hygiene as DV revealed significant effects of SRPV (only at stages two and three), PRWS and SRCH. According to the results in Model 4, the strongest predictor of hygiene was PRWS ($\beta = 0.332$), followed by SRCH ($\beta = 0.309$). Unlike the significant effect at earlier stages of the analysis, SRPV no longer displayed significant associations with increased hygiene when SRCHQ was included in the equation. Adding SRCHQ as a predictor in Model 4 resulted in explaining 6.7% of the unique variance in hygiene.

When the order of the steps in the hierarchical regression was flipped, SRCHQ alone accounted for 39.2% of the variance in social distancing, whereas PRWS and nonspecific measures accounted for only 1.8%. SRCHQ alone explained 18.9% of the variance in hygiene, while PRWS and nonspecific measures accounted for 10.5% of its variance (the details of additional regressions are reported in *Supplemental Material*).

Table 3

Hierarchical regression models with the results of narcissistic personality questionnaires (HSNS and NPI-13), Social Responsibility Personal Values Survey (SRPVS), Pandemic-Related Worries Survey (PRWS) and Sense of Responsibility for Collective Health Questionnaire (SRCHQ) as predictors of social distancing and hygiene during the COVID-19 pandemic.

| | Social distancing | | | | Hygiene | | |
|------------------|--|-------|--------|--|--|-------|--------|
| | β | t | p | | β | t | p |
| Model 1 | | | | | | | |
| Intercept | | 6.94 | < .001 | | | 11.61 | < .001 |
| HSNS | 0.011 | 0.15 | 0.880 | | 0.050 | 0.72 | 0.475 |
| NPI-13 | -0.228 | -3.28 | 0.001 | | -0.139 | -1.97 | 0.051 |
| Model Fit | $R^2 = 0.051$; $F(2, 210) = 5.64$; $p = 0.004$ | | | | $R^2 = 0.018$; $F(2, 210) = 1.96$; $p = 0.144$ | | |
| Model 2 | | | | | | | |
| Intercept | | 0.67 | 0.507 | | | 5.19 | < .001 |
| HSNS | 0.038 | 0.58 | 0.565 | | 0.069 | 0.99 | 0.321 |
| NPI-13 | -0.179 | -2.73 | 0.007 | | -0.107 | -1.53 | 0.127 |
| SRPVS | 0.357 | 5.59 | < .001 | | 0.238 | 3.52 | < .001 |
| Model Fit | $R^2 = 0.174$; $\Delta R^2 = 0.124$ $F(3, 209) = 14.73$; $p < 0.001$ | | | | $R^2 = 0.170$; $\Delta R^2 = 0.055$ $F(3, 209) = 5.50$; $p = 0.001$ | | |
| Model 3 | | | | | | | |
| Intercept | | -0.06 | 0.950 | | | 3.79 | < .001 |
| HSNS | 0.004 | 0.06 | 0.952 | | -0.009 | -0.14 | 0.887 |
| NPI-13 | -0.179 | -2.76 | 0.006 | | -0.105 | -1.64 | 0.102 |
| SRPVS | 0.340 | 5.39 | < .001 | | 0.200 | 3.21 | 0.002 |
| PRWS | 0.173 | 2.73 | 0.007 | | 0.400 | 6.42 | < .001 |
| Model Fit | $R^2 = 0.203$; $\Delta R^2 = 0.029$ $F(4, 208) = 13.25$; $p < 0.001$ | | | | $R^2 = 0.173$; $\Delta R^2 = 0.153$ $F(4, 208) = 15.22$; $p < 0.001$ | | |
| Model 4 | | | | | | | |
| Intercept | | -3.57 | < .001 | | | 1.77 | 0.078 |
| HSNS | -0.009 | -0.17 | 0.867 | | -0.017 | -0.27 | 0.786 |
| NPI-13 | -0.053 | -0.93 | 0.356 | | -0.033 | -0.53 | 0.598 |
| SRPV | 0.127 | 2.12 | 0.035 | | 0.078 | 1.19 | 0.234 |
| SRPVS | 0.054 | 0.96 | 0.339 | | 0.332 | 5.39 | < .001 |
| SRCH | 0.541 | 8.52 | < .001 | | 0.309 | 4.44 | < .001 |
| Model Fit | $R^2 = 0.410$; $\Delta R^2 = 0.207$ $F(5, 207) = 28.76$ $p < 0.001$ | | | | $R^2 = 0.276$; $\Delta R^2 = 0.067$ $F(5, 207) = 17.22$; $p < 0.001$ | | |

Note. PRWS = Pandemic Related Worries Survey, HSNS = Hypersensitive Narcissism, NPI-13 = Narcissistic Personality Inventory, SRCH = Sense of Responsibility for Collective Health Questionnaire, SRPVS = Social Responsibility Personal Values Scale.

3.3 Discussion

In the current study, we examined the role of context-specific individual differences and dispositional traits as predictors of compliance with social distancing and increased hygiene routines. We were especially interested in determining the predictive power of individual differences in the sense of responsibility for collective health (SRCH) as the variable capturing the current pandemic context and the approach to the pandemic as a collective (instead of only a personal) challenge. As hypothesized, we found that people who display higher levels of SRCH are more likely than people with relatively lower levels of SRCH to keep their social distance and to maintain recommended hygiene practices.

We also found that apart from SRCH, social responsibility values (SRPV) explained the unique variance in social distancing (although less than SRCH), while a significant portion of the unique variance in hygiene (larger than in the case of SRCH) was explained by pandemic-related worries.

These results suggest that to predict whether people will practice social distancing, it is useful to know if they are oriented towards others and have a strong feeling of responsibility for collective health during a pandemic or if they have a dispositional tendency to adhere to social responsibility values. Thinking intuitively, one might suppose that focusing on oneself and feeling worried about being infected would facilitate keeping a physical distance from other people. The results indicate otherwise; to display social distancing, a person must have high social motivation to contribute to the common good, thus being focused on others (the collective) rather than solely on oneself.

We also found that to predict the intensity of hygiene practices, it is worth assessing the level of pandemic-related worries, along with the level of SRCH. As both variables contain an emotional aspect akin to anxiety, i.e., worry or concern, they may facilitate behavior aimed at personal protection from the virus in a similar way (in contrast to the social character of physical distancing from other people being best predicted only by the other-oriented individual difference variables).

4. Conclusions

Although the current pandemic is the problem of each collective affected by the virus, it can be suppressed with the effort of every individual, since, according to medical evidence, infection may be asymptomatic, and each infected person may thus further infect others unwittingly (see Anderson, Heesterbeek, Klinkenberg, & Hollingsworth, 2020). Thus, preventing the spread of the virus from person to person is critical for controlling and suppressing the current pandemic. It is, therefore, necessary that an individual concentrates on protecting the health of one's collective, including oneself as its member.

To measure this specific *mindset* involving pandemics, we put forward a concept of sense of responsibility for collective health (SRCH) and examined whether it can predict health-related behaviors during a pandemic. This concept reflects a person's concern over the health of the collective that one belongs to and feeling obliged to help suppress the pandemic.

The results of both of our studies confirmed the usefulness of the SRCH as a context-specific measure in predicting the acceptance of restrictions aimed at preventing the spread of the coronavirus (Study 1) and the adherence to social distancing and increased hygiene during the current pandemic (Study 2).

Additionally, we found that SRCH explained a unique portion of the variance in the acceptance of restrictions and that it also explained a unique portion of the variance of both health-related types of behaviors endorsed during the pandemic. Interestingly, in comparison with pandemic-related worries, SRCH turned out to be a stronger predictor of restrictions' acceptance, whereas pandemic-related worries better predicted increased hygiene activities. It is interesting that worries about being infected were not uniquely related to social distancing practices. It seems that the feeling of being socially responsible for the health of others strongly regulates social behavior, which during the pandemic means distancing oneself from others. In turn, worry or anxiety is involved with concentration on oneself, which may result in undertaking actions focused directly on protecting oneself and those who are closest to oneself. Trying to remove the virus through cleaning and washing may best serve that purpose. Thus, it appears as though such affective states may provoke the avoidance of threats likely associated with the contamination of physical objects rather than with contact with other people (particularly if they do not manifest symptoms of the illness). Additionally, when people are in a state of anxiety, they tend to affiliate with others (Schachter, 1959), which may hinder their willingness to physical distancing. Thus, anxiety may provoke two opposite tendencies: the tendency to avoid other people as potential sources of infection and the proneness to be close to them to alleviate the stress caused by the pandemic. However, when the negative affect associated with the pandemic takes the form of concern rather than anxiety and is combined with a feeling of obligation, it may promote an adaptive response to the pandemic, i.e., protecting the collective from the possible infection. This may manifest in both distancing and hygiene measures.

Previous studies have shown that personally valuing social responsibility is conducive to more social distancing (Oosterhoff & Palmer, 2020). The results of our study confirmed the significance of social responsibility personal values (considered herein as an other-oriented, dispositional variable) in predicting health-related behavior, at the same time showing that when considered jointly, SRCH still explained a unique portion of the variance of the dependent variables. This result may indicate that when social responsibility is grounded in concern for collective health, it can additionally strengthen one's motivation to comply with health-protecting rules of conduct.

Our findings demonstrate that it is useful to apply specific measures in predicting concrete behavior, which in the current situation posed by the COVID-19 pandemic means social (physical) distancing and hygiene practices. This finding was made even more clear when we assessed the contribution of narcissistic traits in explaining the variance of health-related behavior. Only grandiose narcissism was significantly negatively correlated with social distancing. However, grandiose narcissism no longer predicted social distancing after controlling for context-specific predictors. Additionally, neither type of narcissism predicted the acceptance of restrictions or hygiene practices introduced to mitigate the COVID-19 pandemic. Therefore, the role of enduring personality traits in the prediction of compliance with measures aimed at suppressing the pandemic may be very limited.

By indicating the importance of focusing on other people (the collective) during the pandemic, our findings confirm the existing results indicating that thinking in terms of the collective can contribute to higher levels of compliance with the current pandemic demands. In a study conducted by Campos-Mercade, Meier, Schneider, and Wengström (2020), prosociality was understood as the readiness to incur a cost to avoid others' losses when predicting health-related behaviors. Similarly, empathy has been shown to play a promoting role in social distancing (Pfattheicher, Nockur, Böhm, Sassenrath, & Petersen, 2020). Everett, Colombatto, Chituc, Brady, & Crockett, 2020) experimental study showed that the most effective (although

still modest) way of increasing readiness to adopt health-protection habits during a pandemic (handwashing, avoiding gatherings, self-isolation, etc.) is through messages invoking a sense of civic duty (i.e., responsibility for protecting others). Messages referring to virtues (i.e., being a good person) or utilitarianism (i.e., resigning from current comfort to benefit in the long term) were shown to be relatively less effective.

As the measure of individual differences in SRCH we presented herein turned out to be a robust predictor of health-related behavior, it can thus be used in practice. First, it can be used to predict an individual's level of readiness to adopt a behavior that contributes to the collective effort aimed at stopping a pandemic. Second, as the SRCH questionnaire is short, it can be easily applied to monitor health-protecting attitudes in groups. Based on our results, we could expect that a decrease in SRCH would indicate decreased compliance with health recommendations. Third, the theoretical grounds of the SRCH concept may be useful in developing messages encouraging the public to adopt a health-protecting mindset. Such messages would appeal to the concern for collective health and at the same time underscore the manner of conduct of every individual in the collective as being equally important in suppressing the pandemic. According to our evidence, such messages should influence one's motivation to isolate and maintain social (physical) distance. In contrast, an increase in practices such as washing and disinfecting one's hands or wearing a face mask properly may be more likely if messages are focused on personal protection against infection. We believe that these distinct kinds of messages have the potential to activate and strengthen the right attitudes and emotions and that they serve as area-targeted persuasion. However, as our studies were conducted using a correlational design, the validity of these practical suggestions should be verified in future experimental studies.

Both of our studies have limitations worth describing. First, the abovementioned correlational design precludes any causal inferences, which may require further investigation. Additionally, we used declarative measures to examine health-related behavior. These

measures, along with the declaration of social responsibility values and SRCH, may be taken as being socially desirable. This might be the reason that we obtained such high scores for those measures. Other studies have also confirmed a high level of acceptance towards precautionary measures (Maj & Skarżyńska, 2020) and very high adherence to precautionary measures (Maj & Skarżyńska, 2020; Zajenkowski et al., 2020) across the Polish population during the COVID-19 pandemic. However, our results indicated that there was still a reasonable amount of variance, which allowed us to calculate associations between the variables. This was possible even in for the first study results, which was conducted when there was a strong pressure to comply with pandemic-related restrictions. Nevertheless, the individual differences we detected (i.e., in pandemic-related worries and in SRCH) still explained the level of acceptance towards restrictions, social distancing, and hygiene.

The results of our studies show the advantage of using context-specific measures to predict health-related behavior during a pandemic, which in our studies were measured as the sense of responsibility for collective health and pandemic-related worries. Additionally, our results show the significance of focusing on the collective rather than on oneself among the members of communities affected by the coronavirus. By identifying these two characteristics as robust predictors of compliance with COVID-19-containing measures, our studies can contribute to a better understanding and prediction of people's responses to threatening situations, such as the COVID-19 pandemic.

Appendix A. Supplementary data

https://osf.io/wt9qn/?view_only=fb1938fd89bb4d2abf7a60adfc8f2593

References

- Allington, D., Duffy, B., Wessely, S., Dhavan, N., & Rubin, J. (2020). Health-protective behaviour, social media usage and conspiracy belief during the COVID-19 public health emergency. *Psychological Medicine*, 1–7. <https://doi.org/10.1017/S003329172000224X>
- Anderson, W. T., & Cunningham, W. H. (1972). The socially conscious consumer. *Journal of Marketing*, 36(3), 23–31. <https://doi.org/10.2307/1251036>
- Anderson, R. M., Heesterbeek, H., Klinkenberg, D., & Hollingsworth, T. D. (2020). How will country-based mitigation measures influence the course of the COVID-19 epidemic? *The Lancet*, 395, 931-934. [https://doi.org/10.1016/S0140-6736\(20\)30567-5](https://doi.org/10.1016/S0140-6736(20)30567-5)
- Bai, Y., Yao, L., Wei, T., Tian, F., Jin, D., Chen, L., & Wang, M. (2020). Presumed asymptomatic carrier transmission of COVID-19. *JAMA*, 323(14), 1406–1407. DOI:10.1001/jama.2020.2565
- Bandura, A. (2012). On the functional properties of perceived self-efficacy revisited. *Journal of Management*, 38(1), 9–44. <https://doi.org/10.1177/0149206311410606>
- Bazińska, R., & Drat-Ruszczak, K. (2000). Struktura narcyzmu w polskiej adaptacji kwestionariusza NPI Ruskina i Halla. [The structure of narcissism in Polish adaptation of Raskin's & Hall's NPI]. *Czasopismo Psychologiczne* 6(3), 171-188
- Bavel, J. J.V., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., & Willer, R. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour*, 4(5), 460–471. <https://doi.org/10.1038/s41562-020-0884-z>
- Berkowitz, L., & Daniels, L. R. (1964). Affecting the salience of the social responsibility norm: effects of past help on the response to dependency relationships. *The Journal of Abnormal and Social Psychology*, 68(3), 275–81. <https://doi.org/10.1037/h0040164>
- Blagov, P. S. (2020). Adaptive and Dark Personality in the COVID-19 pandemic: Predicting health-behavior endorsement and the appeal of public-health messages. *Social Psychological and Personality Science*, <https://doi.org/10.1177/1948550620936439>

- Box, G. E. P., & Cox, D. R. (1982). An analysis of transformation revisited, rebutted. *Journal of the American Statistical Association*, 77, 209-210.
- Campos-Mercade, P., Meier, A. N., Schneider, F. H., & Wengström, E. (2020). Prosociality predicts health behaviors during the COVID-19 pandemic, *Working Paper*, No. 346, University of Zurich, Department of Economics, Zurich, <http://dx.doi.org/10.5167/uzh-187672>
- Caprara, G. V., Barbaranelli, C., Pastorelli, C., & Cervone, D. (2004). The contribution of self-efficacy beliefs to psychosocial outcomes in adolescence: predicting beyond global dispositional tendencies. *Personality and Individual Differences*, 37(4), 751–763. <https://doi.org/10.1016/j.paid.2003.11.003>
- Clark, C., Davila, A., Regis, M., & Kraus, S. (2020). Predictors of COVID-19 voluntary compliance behaviors: An international investigation. *Global Transitions*, 2, 76–82. <https://doi.org/10.1016/j.glt.2020.06.003>
- Drury, J. (2012). Collective resilience in mass emergencies and disasters. In J. Jetten, C. Haslam, & S. A. Haslam (Eds.), *The social cure: Identity, health and well-being* (pp. 195- 215). Psychology Press.
- Engle, S., Stromme, J., & Zhou, A. (2020). Staying at home: Mobility effects of COVID-19. *Working paper*. <http://dx.doi.org/10.2139/ssrn.3565703>
- Everett, J. A., Colombatto, C., Chituc, V, Brady, W.J., & Crockett, M. J (2020). The effectiveness of moral messages on public health behavioral intentions during the COVID-19 pandemic. *PsyArXiv Preprints*. doi: 10.31234/osf.io/9yqs8
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149-1160.

- Flanagan, C. A., Syvertsen, A. K., & Stout, M. D. (2007). Civic measurement models: Tapping adolescents' civic engagement. *Circle Working Paper 55*.
- Gentile, B., Miller, J. D., Hoffman, B. J., Reidy, D. E., Zeichner, A., & Campbell, W. K. (2013). A test of two brief measures of grandiose narcissism: The Narcissistic Personality Inventory–13 and the Narcissistic Personality Inventory-16. *Psychological Assessment, 25*(4), 1120–1136.
- George, D., & Mallery, M. (2010). *SPSS for windows step by step: A simple guide and reference, 17.0 update* (10th ed.). Pearson.
- Harper, C. A., Satchell, L. P., Fido, D., & Latzman, R. D. (2020). Functional fear predicts public health compliance in the COVID-19 pandemic. *International Journal of Mental Health and Addiction, 1*–14. <https://doi.org/10.1007/s11469-020-00281-5>
- Hendin, H. M., & Cheek, J. M. (1997). Assessing hypersensitive narcissism: A reexamination of Murray's narcissism scale. *Journal of Research in Personality, 31*(4), 588–599. <https://doi.org/10.1006/jrpe.1997.2204>
- Holmes, E. A., O'Connor, R. C., Perry, V. H., Tracey, I., Wessely, S., Arseneault, L., & Bullmore, E. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. *The Lancet Psychiatry, 7*(6), 547–560. [https://doi.org/10.1016/S2215-0366\(20\)30168-1](https://doi.org/10.1016/S2215-0366(20)30168-1)
- Jetten, J., Reicher, S. D., Haslam, A., & Cruwys, T. (2020). *Together Apart: The psychology of COVID-19*. Los Angeles: Sage Publications.
- Jordan, R. E., Adab, P., & Cheng, K. K. (2020). Covid-19: Risk factors for severe disease and death. *BMJ, 368*:m1198. DOI: 10.1136/bmj.m1198
- Kissler, S. M., Tedijanto, C., Lipsitch, M., & Grad, Y. (2020). Social distancing strategies for curbing the COVID-19 epidemic. Preprint at *MedRxiv* <https://doi.org/10.1101/2020.03.22.20041079>

- Kraemer, M., Yang, C. H., Gutierrez, B., Wu, C. H., Klein, B., Pigott, D. M., ..., & Scarpino, S. V. (2020). The effect of human mobility and control measures on the COVID-19 epidemic in China. *Science*, 368 (6490) 493-497. DOI: 10.1126/science.abb4218
- Leary, A., Dvorak, R., De Leon, A., Peterson, R., & Troop-Gordon, W. (2020, May 13). COVID-19 social distancing. <https://doi.org/10.31234/osf.io/mszw2>
- Maj, K., & Skarżyńska, K. (2020). *Spółeczeństwo wobec epidemii. Raport z badań [Society against the pandemic. Research report]*. Warszawa, Fundacja im. Stefana Batorego.
- Mertens, G., Gerritsen, L., Duijndam, S., Salemink, E., & Engelhard, I. M. (2020). Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020. *Journal of Anxiety Disorders*, 74, 102258. <https://doi.org/10.1016/j.janxdis.2020.102258>
- Miguel, F. K., Machado, G. M., Pianowski, G., & Carvalho, L. F. (2021). Compliance with containment measures to the COVID-19 pandemic over time: Do antisocial traits matter?. *Personality and Individual Differences*, 168, 110346. <https://doi.org/10.1016/j.paid.2020.110346>
- Miller, J. D., Hoffman, B. J., Gaughan, E. T., Gentile, B., Maples, J., & Campbell, W. K. (2011). Grandiose and vulnerable narcissism: A nomological network analysis. *Journal of Personality*, 79, 1013–1042. doi:10.1111/j.1467-6494.2010.00711.x
- Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, 102(2), 246–268. <https://doi.org/10.1037/0033-295X.102.2.246>
- Nowak, B., Brzóska, P., Piotrowski, J., Sedikides, C., Żemojtel-Piotrowska, M., & Jonason, P. K. (2020). Adaptive and maladaptive behavior during the COVID-19 pandemic: The roles of Dark Triad traits, collective narcissism, and health beliefs.

Personality and Individual Differences, 167, 110232.

<https://doi.org/10.1016/j.paid.2020.110232>

Oosterhoff, B., & Palmer, C. A. (2020). Psychological correlates of news monitoring, social distancing, disinfecting, and hoarding behaviors among US adolescents during the COVID-19 pandemic. *PsyArXiv Preprints*. <https://doi.org/10.31234/osf.io/rpcy4>

Pfattheicher, S., Nockur, L., Böhm, R., Sassenrath, C., & Petersen, M. (2020, March 23). The emotional path to action: Empathy promotes physical distancing and wearing face masks during the COVID-19 pandemic. *PsyArXiv Preprints*.
<https://doi.org/10.31234/osf.io/y2cg5>

Raskin, R., & Hall, T. (1988). A principal-components analysis of the Narcissistic Personality Inventory and further evidence of its construct validity. *Journal of Personality and Social Psychology*, 54, 890–902.

Sakia, R. M. (1992). The Box-Cox transformation technique: a review. *The Statistician*, 41, 169-178.

Schachter, S. (1959). *The psychology of affiliation: Experimental studies of the sources of gregariousness*. Stanford University Press.

Syvertsen, A. K., Wray-Lake, L., & Metzger, A. (2015). *Youth civic and character measures toolkit*. Minneapolis, MN: Search Institute.

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin, & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33- 47).
Monterey, CA: Brooks/Cole.

Taylor, S., Landry, C.A., Paluszec, M. M., & Asmundson, G.J.G. (2020). Reactions to COVID-19: Differential predictors of distress, avoidance, and disregard for social distancing. *Journal of Affective Disorders*, 277, 94–98. DOI: 10.1016/j.jad.2020.08.002.

- Wise, T., Zbozinek, T., Michelini, G., Hagan, C. C., & Mobbs, D. (2020). Changes in risk perception and protective behavior during the first week of the COVID-19 pandemic in the United States. *Preprint at PsyArXiv*. <https://doi.org/10.31234/osf.io/dz428>
- Zajenkowski, M., Jonason, P. K., Leniarska, M., & Kozakiewicz, Z. (2020). Who complies with the restrictions to reduce the spread of COVID-19?: Personality and perceptions of the COVID-19 situation. *Personality and Individual Differences*, 166, 110199. <https://doi.org/10.1016/j.paid.2020.110199>
- Żemojtel-Piotrowska, M., Piotrowski, J., Rogoza, R., Baran, T., Hitokoto, H., Maltby, J. (2018): Cross-cultural invariance of NPI-13: Entitlement as culturally specific, leadership and grandiosity as culturally universal. *International Journal of Psychology*, 54(4), 439-447. DOI: 10.1002/ijop.12487