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Positive and negative perceptions of the COVID-19 pandemic: Does personality play a role?

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ABSTRACT

Objective: The lockdown measures following the COVID-19 outbreak in early 2020, intended to slow the spread of the virus, forced a sudden and dramatic change to most everyday lives. However, not all individuals may have been affected in the same way. In addition to situational factors such as occupation, family status, and health, personality traits may affect how individuals experienced the initial crisis.

Methods: Using data from the pairfam COVID-19 survey, an online survey of the participants of the German Family Panel pairfam conducted from May to July 2020, as well as personality data from the pairfam panel data, this study analyzes whether the Big Five personality traits influence the degree to which young and middle-aged individuals (16–49 years old) felt negatively affected by and were able to see any benefits of the initial COVID-19 lockdown in Germany.

Results: While neuroticism is linked to a more negative perception of the restrictions to daily life, openness to experiences is associated with more positive perceptions of the situation. Like neuroticism, extraversion is also associated with a more negative perception, but only among respondents without a partner. For respondents with a romantic partner, no association was found.

Conclusion: Results confirm that personality plays a role in individual perceptions of the pandemic situation. Moreover, they show that most individuals perceived not only negative but also positive aspects of the COVID-19 pandemic situation in 2020.

1. Introduction

The global outbreak of the Corona Virus Disease 2019 (COVID-19) in early 2020 caused a sudden and dramatic change to most people’s everyday lives. To reduce the spread of the virus, hygiene and safety measures were executed by governments to reduce physical contact between individuals. As in many other countries around the world, the subsequent lockdown ordinance in Germany (from March 23rd, 2020) prescribed the closing of most places people typically gather such as schools and child care facilities, stores (excluding supermarkets), cinemas and theaters, bars, and restaurants. Many borders were closed, employees were advised to work from home when possible, and physical contact was (mostly) limited to members of the same household (Steinmetz et al., 2020). After several weeks, measures were gradually relaxed (e.g., stores reopened on April 20th, 2020, and contact limitations were relaxed on June 5th, 2020), but restrictions regarding public events and in-person meetings of (large) groups have remained in place.

While these measures pose severe restrictions to normal everyday life, not all individuals were affected to the same extent. For instance, health risks, as well as financial and employment effects differed according to age and life circumstances. In fact, the pandemic may have had not only negative but also positive effects on some individuals’ lives. For instance, contact limitations in combination with the closing of schools, leisure time facilities, and stores led to a deceleration of everyday life (Kraaijenbrink, 2020; The Learning Network, 2020). Reduced working hours and work from home ordinances (Mohring et al., 2020) granted more free time for many employees, resulting in increased participation in outdoor recreational activities (Venter et al., 2020). Adverse economic effects, in particular reduced income, were bolstered by government subsidies in many cases (Naumann et al., 2020). Whether an individual perceived the situation as positive or negative, however, depends heavily on individual resources and life circumstances.

Personality traits may also play a role in the perception of the
consequences caused by the pandemic. Several studies have already focused on the association between the COVID-19 pandemic and personality traits – some with regard to compliance (Roma et al., 2020) or adherence to governmental regulations (Bogg and Milad, 2020; Zajenkowski et al., 2020; Zettler et al., 2020), others with a focus on psychological maladjustment (Kroencke et al., 2020; Liu et al., 2020; Mazza et al., 2020).

This study focuses on the role of the Big Five personality traits in the perception of the lockdown measures during the first wave of the COVID-19 pandemic in Germany. Analyses are based on the pairfam COVID-19 survey, an online survey of young and middle-aged (16–49) respondents of the German Family Panel pairfam fielded from mid-May to mid-July 2020. During this period, strict lockdown ordinances were no longer in place, but additional measures such as contact limitations and restrictions regarding public events were still in place. Data on the Big Five inventory were collected during the regular pairfam panel waves 1–2 years before the pandemic. This study investigates whether individuals experience and evaluate the situation differently according to their personality. It is important to note that these analyses also consider possible positive perceptions of the consequences of the pandemic, which has thus far not been adequately acknowledged in research on the topic.

2. Background

The sudden outbreak of the pandemic and the ensuing lockdown measures caused a stressful situation (e.g., Flesia et al., 2020; Petzold et al., 2020). Therefore, to understand differences in perception due to various personality traits, this study draws on stress theory. Individuals may perceive a stressful situation differently according to their personality (Vollrath 2001). Referring to the transactional theory of stress and coping (Lazarus and Folkman, 1987), not the stressor itself, but the individual appraisal of the situation is the relevant factor for individual distress. Individuals first evaluate whether a situation or event is relevant to their life or personal well-being, and then focus on possibilities to cope with the situation. Both steps – primary appraisal and coping – depend on personal resources and dispositions, such as situational influences and personality.

To explain the role the Big Five personality traits play in stressful situations, the following considers potential mechanisms for each of the five traits, including both general mechanisms and those related to specific aspects of the pandemic.

Neuroticism has been found to be positively associated with perceived stress (Ebstrup et al., 2011) and negatively linked to emotion regulation (Baranczuk, 2019). People with high neuroticism scores are more likely to perceive situations as threatening (Vollrath, 2001). Moreover, individuals scoring high in neuroticism may apply less effective coping strategies and thus be more affected by stressors (Baran szczuk, 2019). Negative effects of openness have also been reported in the context of the pandemic: Nikcević et al. (2021) reported a positive association between higher openness scores and COVID-19-specific anxiety, which may be due to openness more easily leading to risky and even careless behaviors, which may then evoke the fear of infection.

Extraversion is, in general, related to better emotion regulation (Baranczuk, 2019) and lower perceived stress (Ebstrup et al., 2011). Although extraversion is generally found to be associated with lower stress levels and better coping, restrictions during the COVID-19 lockdown may prove particularly challenging for extraverted individuals. Liu et al. (2020) found higher extraversion scores to be associated with higher levels of stress during the pandemic. Wijngaards et al. (2020) concentrated on the aspect of feeling safe under the strict lockdown measures and found a positive, but not significant effect of high extraversion on depressiveness, whereas introverts showed less depressive symptoms in regions with strict measures. In contrast, Nikcević et al. (2021) report a negative association of extraversion with health anxiety and COVID-19-specific anxiety and even describe extraversion as a protective factor against anxiety during the pandemic. One explanation for these contrasting findings may be that extraverted individuals rely on their social networks in stressful situations (Swickert et al., 2002; Vollrath, 2001), which may generally be an effective coping strategy, but was hindered by the contact restrictions during the lockdown. In addition, extraverted individuals, who seek out interaction with others more than introverts, may have been more affected by the contact restrictions in their everyday behaviors. This result is in line with other findings of Folk et al. (2020) who found that extraverted individuals experienced significantly larger drops in social connectedness than introverts during the first weeks after the COVID-19 outbreak. Which of the two mechanisms – extraverts’ generally more effective coping strategy or their larger drops in social connectedness – prevails will depend on individual circumstances as, for instance, opportunities for social interaction remained for individuals living with a partner and children more than for those without a partner.

Findings for conscientiousness and general stress are similar to those for extraversion: A positive association between high levels of conscientiousness and emotion regulation (Baranczuk, 2019) as well as a significant negative correlation between perceived stress and conscientiousness (Ebstrup et al., 2011) have been found. Results are also ambiguous regarding conscientiousness in terms of the COVID-19 pandemic. Wijngaards et al. (2020) reported high conscientiousness scores to be associated with the indication of depressive symptoms. In contrast, Flesia et al. (2020) showed a beneficial impact of conscientiousness on psychological stress, arguing that conscientiousness may positively influence adaptive behavior and frustration tolerance. Nikcević et al. (2021) also reported negative correlations between conscientiousness and both depressive symptoms and anxiety, describing conscientiousness as a protective factor for both COVID-19-specific anxiety and health anxiety in general.

Agreeableness is associated with lower levels of general psychological stress (Baranczuk, 2019). Agreeable individuals consider the social dimension, the needs of others (Carver and Connor-Smith, 2010), and may be more confident that they will be able to rely on their social network in stressful situations (Vollrath, 2001). Regarding the COVID-19 pandemic, agreeableness is the only Big Five trait to be
associated with greater compliance (Zajenkowski et al., 2020), which corresponds to social behaviors linked with agreeableness. Moreover, agreeable individuals were found to show lower levels of psychological stress during the pandemic (Plesia et al., 2020), and depressive symptoms and anxiety were negatively correlated with agreeableness (Nikčević et al., 2021).

In sum, high levels of neuroticism are associated with a stronger perception of stress, whereas openness, extraversion, conscientiousness, and agreeableness seem to act as buffers against the perception of stress (e.g., Carver and Connor-Smith, 2010; Vollrath, 2001) which may be true also for the specific situation of the COVID-19 pandemic.

Accordingly, a strong association between neuroticism and a more negative perception of the consequences of the pandemic is expected. Openness to experiences and agreeableness, in contrast, are expected to be associated with a more positive perception of the situation during the pandemic. The effect of conscientiousness and extraversion are unclear: Both positive and negative effects can be expected, as both were found in previous research. For extraversion, a clear association with negative perceptions as well as a less positive evaluation among extraverted single respondents is expected, as they may be particularly affected by contact limitations during lockdown.

3. Methods

The pairfam COVID-19 study is an add-on survey to the German Family Panel pairfam (Brüderl et al., 2020). Since 2008, pairfam collects annual data from randomly sampled German-speaking individuals from the birth cohorts 1971–73, 1981–83, 1991–93, and 2001–03 (since 2018). The focus of the panel study is intimate relationships and family life, including topics such as fertility, union formation, relationship quality, parenting and parent-child relationships, and well-being. Respondents are surveyed annually in computer-assisted personal interviews. Informed consent is obtained from all participants included in the study by the professional interviewers at the beginning of each interview. For further information about the design and focus of the pairfam study, see Huinink et al. (2011).

At the outbreak of the COVID-19 pandemic, all panel participants (N = 9640) were invited to complete a supplementary survey concerning their well-being and family life during the lockdown in Germany (see Gummer et al., 2020). Data were collected from 3176 respondents in a 15-min online survey from May 19th, 2020 to July 13th, 2020 (see Walper et al., 2020). Informed consent was obtained from all participants. The survey covered a wide range of topics, including occupational situation and schooling, parenting, family life, and relationship quality, as well as loneliness, worries, and well-being.

Two dimensions of respondents’ perceptions of the pandemic are assessed here to capture both negative and positive aspects. After the prompt “In sum: What has been your experience during the COVID-19 pandemic?”, participants responded to four separate items, the first two of which have been assessed here: “The period has strongly affected me personally” (original: ‘Die Zeit hat mich persönlich stark belastet’), termed negative perception, and “I can see the positive sides of this period as well” (original: ‘Ich kann dieser Zeit auch gute Seiten abgewinnen’), termed positive perception in the following. The items were answered on an end-pole labeled five-point response scale ranging from (1) “not at all” to (5) “absolutely”. Item nonresponse (i.e., “Don’t know” and “No answer”) to these two items was 0.4% and 0.9%, respectively. The other two items (“This period has strongly affected us as a family in a negative way.” and “This period has strengthened our family bond.”) were addressed only to subgroups of respondents with partners, parents, and/or children in the household and are therefore not included in this analysis.

Respondents’ Big Five personality traits were measured in the panel study in waves 10 or 11 for two subsamples: Personality traits were included in the regular wave 10 questionnaire program whereas respondents from the refreshment sample (added in wave 11) received this module in their first wave of participation, wave 11. Thus, for 1387 respondents, data stem from 2017/2018 (wave 10) and for 1492 respondents, data are from 2018/2019 (wave 11). The resulting time lag does not have negative consequences as personality traits are regarded as relatively stable (e.g., Cobb-Clark and Schurer, 2012).

The dimensions extraversion, openness, conscientiousness, agreeableness, and neuroticism were assessed using a short version of the Big Five Inventory (BFI-K; Rammstedt and John, 2005) with four items per dimension (exception: five items for openness). The response format ranges from (1) “Absolutely incorrect” to (5) “Absolutely correct” (for more information, see Thönissen et al., 2020). In the analytical sample, Cronbach’s alpha for extraversion was 0.80, 0.69 for openness, 0.68 for conscientiousness, 0.62 for agreeableness, and 0.74 for neuroticism – as expected for the intended heterogeneity of dimensions in these traits (Rammstedt and John, 2005).

In the sample, 3 percent of all observations had missing values for one or more of the dependent or independent variables analyzed (see Table A1 in the Appendix for % missing values of variables). Observations with missing values were excluded from the analysis (listwise deletion) as this degree of missingness does not require steps such as multiple imputation (see e.g., Jakobsen et al., 2017). The final analytical sample includes a total of 2879 respondents.

Not many potential confounding factors are likely regarding the association of the perception of the pandemic and its countermeasures with (relatively) stable personality traits measured one or two years earlier. Gender and age (birth cohort) may both be associated with personality as well as the negative perception of stress caused by the pandemic, and are therefore controlled for. In addition, models include two variables from the online survey indicating whether the respondent has a partner (without differentiating between status, i.e., LAT, cohabiting, and married) or children in the household.

To test the role of relationship status in the association of extraversion with the perception of the pandemic, additional regressions are run for respondents with and without a partner at the time of the online survey.

In sum, three models (i.e., the full sample, respondents without a partner, and respondents with a partner) for each of the two dependent variables are estimated. Weighted OLS regressions with robust standard errors (Huber-White estimators) are estimated. Weights were implemented to account for selective unit nonresponse (for details regarding weights in the pairfam COVID-19 data, see Walper et al., 2020). We present unstandardized coefficients.

4. Results

First, selective participation bias in the COVID-19 survey was ruled out. The summary statistics of the central variables shown in Table 1 do

| Table 1 | Main characteristics of pairfam COVID-19 and panel samples. |
|---------|-------------------------------------------------------------|
|         | pairfam COVID-19 sample | pairfam sample Wave 11 |
| Age     | (Range: 16-49)        | 31.70 (11.02)          | 29.97 (10.49) |
| Gender  | (% female respondents)| 57.81                  | 53.18        |
| Respondents with partner (%) | 66.59                 | 60.14                 |
| Respondents with cohabiting children (%) | 37.38                | 36.51                 |
| Big Five (Range: 1-5)          |
| Neuroticism |                         | 2.82 (0.85)          | 2.79 (0.82) |
| Openness  |                           | 3.66 (0.73)          | 3.64 (0.72) |
| Extraversion |                           | 3.39 (0.89)          | 3.43 (0.85) |
| Conscientiousness |                     | 3.74 (0.68)          | 3.73 (0.67) |
| Agreeableness |                          | 3.20 (0.76)          | 3.19 (0.75) |
| N       | 2879                    | 9435                  |

Note. Means (standard deviations in parentheses); percentages for binary variables; panel sample refers to wave 11 except for the Big Five, which are drawn either from wave 11 or from wave 10 according to data availability.
not indicate selectivity in the COVID-19 sample. Slightly more women participated in the COVID-19 survey than men. In addition, respondents in the COVID-19 sample more often have a partner than in the pairfam panel sample. Regarding the Big Five, no significant differences between the two samples were found (significance tests yielded clearly non-significant results in all five traits).

Fig. 1 illustrates the distribution of the two dependent variables. The majority of respondents reported both positive and negative perceptions, and positive perceptions are even slightly more common than negative perceptions: 26% of respondents agreed with the negative statement (responses 4 and 5 on the five-point scale), whereas 61% agreed to the positive statement (responses 4 and 5 on the response scale). When looking at the extremes, 2% see a maximum of negative and no positive aspects while 9% see no negative and a maximum of positive aspects. Responses to the two items are correlated with a correlation coefficient of $r = 0.27$.

Regression results are shown in Fig. 2 (for full results, see Tables A2 and A3 in the Appendix). As expected, the main personality factor associated with a negative perception of the crisis caused by the COVID-19 pandemic is neuroticism. Respondents scoring high on the neuroticism scale report significantly more negative perceptions toward the pandemic (coeff. $= 0.22$, $p < .001$) than their less neurotic counterparts.

The only personality factor significantly associated with a positive perception of the pandemic is openness to experiences, which is associated with a greater ability to see the positive aspects of the situation (coeff. $= 0.20$, $p < .001$). Extraversion, conscientiousness, and agreeableness are associated with neither positive nor negative perceptions of the pandemic.

To test the hypothesis that the effect of extraversion is larger for single respondents, separate models were estimated for both subsamples. The results presented in Fig. 3 (see Tables A2 and A3 in the Appendix for full results) confirm the hypothesis: Extraversion is significantly associated with negative perceptions in the subsample of single respondents (coeff. $= 0.13$, $p < .05$), but not among respondents with a partner. The difference between effects for respondents with and without a partner is significant as a model with interaction terms shows (Table A4 and A5 in the Appendix). Regarding positive perceptions, no significant difference between respondents with and without a partner is found.

As a further difference between singles and partnered respondents, the effect of conscientiousness on positive perceptions proved significant. Thus, among single respondents, higher conscientiousness was associated with, as a tendency, less positive perceptions whereas among respondents in a romantic relationship higher conscientiousness was associated with significantly more positive perceptions of the pandemic (see Fig. 3 and Table A5 in the Appendix).

Although not the focus of this study, some results of the control variables are worth mentioning. No significant differences between single and partnered respondents are found but having cohabiting children is associated with an increase in negative perception. This effect appears to be mainly due to the effect among single parents, but the interaction effect is not significant due to the small number of single parents (see Tables A2 and A4 in the Appendix). Women report more negative perceptions than men, in particular those without a romantic partner. Moreover, significant differences between cohorts are found, which may be caused by different circumstances in the typical life stages corresponding to each birth cohort that are not fully captured by the robust family status variables included in the present analysis. Possible factors may include labor force status, living arrangements, and the age of children living in the household, which are not considered in this study as they do not act as confounding factors in the association of personality and perception of the crisis.

5. Discussion

Individuals are affected differently by the COVID-19 pandemic and the various countermeasures introduced. This study analyzed whether personality traits play a role in how respondents perceived the situation during the COVID-19 outbreak in spring and early summer 2020 in Germany.

Descriptive analyses (Fig. 1) paint a heterogeneous picture of the first phase of the COVID-19 pandemic, with most respondents agreeing to both negative and positive statements regarding the impact of the pandemic and the lockdown on their lives. Remarkably, positive statements were even more frequent than negative. Although the COVID-19 outbreak and the ensuing lockdown were no doubt demanding for the majority of respondents, many saw positive aspects of the situation as well. One explanation may be that the survey was fielded shortly after the first peak of daily infections and the strict lockdown in April 2020, during a time in which measures such as contact limitations, physical distancing, and school closures were still in place, effectively slowing the spread of COVID-19 in Germany. Hence, people may have been optimistic that things might soon return to normal.
Regression estimates (Fig. 2) show that specific personality traits influence how individuals experienced and evaluated the consequences of the COVID-19 outbreak, both positively and negatively. Two of the Big 5 personality traits exhibit significant associations: neuroticism is associated with increased negative perceptions while openness to experiences is linked to an increased perception of positive aspects. This finding holds true both for the total sample and for subsamples of respondents with and without a partner.

Fig. 2. Linear regression of negative and positive perceptions of the pandemic on personality. Coefficients and 95% confidence intervals.

Fig. 3. Linear regression of perceptions of the pandemic on personality for single and partnered respondents, respectively. Coefficients and 95% confidence intervals.
Extraversion was found to be significantly associated with single respondents’ negative perceptions of the pandemic, but not with perceptions of respondents with a partner (Fig. 3). This finding indicates that the stresor was not the pandemic per se, but rather the imposed contact limitations that posed as particular stress factors for extraverted singles.

These results confirm the findings from existing studies that report negative effects of neuroticism in the COVID-19 crisis (e.g., Flesia et al., 2020; Mazza et al., 2020; Nikcević et al., 2021), as well as those showing positive effects of openness (Kroksa et al., 2020; Nikcević et al., 2021). The interpretation regarding neuroticism is straightforward as research has unambiguously linked neuroticism to stress processes and the pandemic does not make an exception in this regard. Individuals scoring higher on the openness scale have been found to evaluate strains more positively (O’Brien and DeLongis, 1996) and appraise stressful situations less negatively (Modersitzki et al., 2020). The effect of openness can also be observed in studies on life satisfaction. Respondents who have high openness see life more positively (DeNeve and Cooper, 1998).

Still, while the association is unambiguous for the specific period when the study was conducted, it will be interesting to see whether it remains throughout the pandemic. In the first weeks of the pandemic, more open individuals may have been able to put up with the uncertainty and the sudden changes in everyday life, but after an extended time of restricted cultural and social activities, they may suffer more from the perceived aesthetic deprivation.

The negative effect of extraversion found here for single respondents is also in line with existing research (Folk et al., 2020; Modersitzki et al., 2020), although contrasting results have also been published (Aschwanden et al., 2021; Ebstrup et al., 2011). The contact limitations, which were one of the main aspects in the German lockdown, seems to have affected extraverted singles in a specific way whereas respondents in romantic relationships could rely, to a certain extent, on their partner to fulfill their need for sociability.

Further, while no link between conscientiousness and respondents’ perception was found in the full sample, results indicate that consciousness plays a different role among singles than among partnered individuals with, as a tendency, negative effects for singles and positive effects among partnered respondents. A tentative explanation may be differences in activities according to life stage. While singles were particularly hindered in their plans and activities during the lockdown (which in particular conscientious individuals perceived negatively), partnered individuals could more easily shift their activities to the private sphere and, for instance, focus on tasks in the house and garden (which conscientious individuals perceived in a particularly positive way). As previous research regarding these two personality traits yielded ambiguous results, associations should be investigated more in detail.

No association between agreeableness and respondents’ perception of the situation during the pandemic was found.

In sum, the findings of this study are in line with prior research concerning stress and its perception if the specific stressors due to the pandemic and the lockdown are considered. A stresor or critical life event such as the crisis caused by the COVID-19 pandemic does not affect all individuals in the same way – both life circumstances and personality traits play a role in their experience and perception (Lazarus and Folkman, 1967).

Despite careful planning and analysis, this study is not without limitations. First, it is limited to the four birth cohorts included in the pairfampanel, which by design excludes older individuals (50+). This weakness is notable, as the elderly comprise a large percentage of the at-risk population and may therefore feel more stressed by the pandemic. Consequently, the effect of neuroticism may be more relevant for older age groups. Second, the pairfam COVID-19 survey does not include detailed records of respondents’ affectedness and behavior during the lockdown, which might mediate the association of personality with the perception of the situation. In particular, information regarding infection and illness is neither available for the respondent nor next of kin.

6. Conclusions

This study contributes to the understanding of how individuals perceived the first wave of the COVID-19 pandemic and the associated societal changes. Aside from situational factors such as household composition, the results reported here show that personality plays a role in individual perceptions of the pandemic situation. In addition, personality factors are shown to be an important possible identification element of stressed individuals during this pandemic. These findings should be used to provide the necessary help to particularly stressed individuals, and should also be taken into account for stress management or psychological interventions. Further research may shed light on these relationships, also with a focus on further personality traits that may similarly affect the perception of the consequences of the pandemic.

Author credit statement

In all steps, both authors contributed equally to the article.

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Appendix A. Supplementary data

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