Heliyon 7 (2021) e08041

Contents lists available at ScienceDirect

Heliyon

journal homepage: www.cell.com/heliyon

Research article

Prosocial behavior during the COVID-19 pandemic in Germany. The role of responsibility and vulnerability

Dshamilja Marie Hellmann [a,*], Angela Rachael Dorrough [a], Andreas Glöckner [a,b]

[a] Social Cognition Center Cologne, University of Cologne, Cologne, Germany
[b] Max Planck Institute for Research on Collective Goods, Bonn, Germany

ARTICLE INFO

Keywords:
COVID-19
Prosocial behavior
Perceived responsibility
Vulnerability

ABSTRACT

In two pre-registered and fully incentivized studies ($N = 501$), we investigate prosocial behavior during the COVID-19 pandemic in Germany. Based on a comparison with pre-pandemic data, Study 1 shows that individuals' general prosociality measured with a (context-independent) Social Value Orientation Slider changed significantly before vs. during the early stage of the pandemic towards increased prosociality. In addition, we identified pandemic-specific context factors for prosocial behavior measured by a series of Dictator games with different recipients. Allocations in the Dictator game increased with the giver's responsibility and the recipients' vulnerability to the virus. Study 2 replicates and extends this finding in a sample representative for the adult German population in terms of age and gender. We show that, for different actors (self, recipient, politicians), different dimensions of responsibility (responsibility to help, responsibility for the problem cause, and for the solution) are associated with prosocial behavior. Contrary to what could be expected from diffusion of responsibility, prosocial behavior increased not only when individuals themselves felt responsible to help but also when they perceived politicians to be responsible to help. Assigning responsibility for the cause of the COVID-19 crisis to recipients and politicians was associated with a decrease in prosocial behavior. However, responsibility for the solution had no influence. We discuss implications for public policies.

1. Introduction

Prosocial behavior, mutual helping, and cooperation are important for societies. Their importance increases even further in times of crisis when a society is faced with major social, economic, and political challenges that require people to stick together and cooperate. Hence, it is fundamental to understand how prosocial behavior develops during crises and to determine factors that promote prosociality. The current COVID-19 pandemic represents the most serious global crisis after World War II, affecting all people and countries across the globe (Word Health Organization, 2020). The UN Secretary-General, António Guterres, called for global solidarity and shared responsibility with a special focus on the most vulnerable (United Nations, 2020). Until the entire population has access to a vaccine against COVID-19, the only way to combat the pandemic is to heighten awareness of individual responsibility to act prosocially to slow the spread of the virus. Thus, political leaders continuously appeal to individual responsibility (World Health Organization, 2020). Although it appeared paradoxical at first, we learned that keeping physical distance (and your child home from school or childcare) is an act of prosocial behavior. Other, more familiar forms of prosocial behavior include providing direct support to others that are infected or struggle with financial or psychological problems as a result of the crisis. Interestingly, not only the help-recipient or the society as a whole benefit from prosocial behavior. There is also evidence that persons who provide help experience reduced negative emotions (e.g., Doré et al., 2017; Raposa et al., 2016) and report improved health status (e.g., Okun et al., 2013; Wang et al., 2020). Recent studies confirm that prosocial behavior during the COVID-19 pandemic results in positive effects on psychological well-being for the prosocially acting persons (Ramkissoon, 2020; Varma et al., 2020).

Prosocial behavior plays a key role in fighting both the cause of the pandemic (the spread of infections) and its far-reaching economic, societal, and psychological consequences. Given its fundamental importance, more research is needed to extend our understanding of prosocial behavior in times of COVID-19: Does this pandemic change individuals' prosociality? Do factors that have previously been shown to increase prosocial behavior generalize to situations of crisis? What are pandemic-specific factors that promote prosocial behavior? Answering these

* Corresponding author.
E-mail address: dhellma3@smail.uni-koeln.de (D.M. Hellmann).

https://doi.org/10.1016/j.heliyon.2021.e08041
Received 12 March 2021; Received in revised form 29 July 2021; Accepted 17 September 2021

questions can help to derive policy implications for the current crisis and beyond. Specifically, a deeper understanding of prosocial behavior during the COVID-19 pandemic might also help to build a post-COVID society and provide useful resources for managing other crises.

Crises such as the current COVID-19 pandemic can bring out the best and worst of individuals, prompting either an increase or decrease in prosociality. Both observations of daily life during the first year of the COVID-19 pandemic as well as theoretical and empirical insights from the scientific world provide examples and evidence for changes in both directions.

Anecdotally, during the COVID-19 outbreak, many inspiring acts of increased prosociality have been reported. People donated money, blood, or protection equipment and volunteered to sew masks or deliver medical supplies and groceries to their elderly neighbors. Grassroots movements and neighborhood initiatives emerged to provide help for high-risk groups (e.g., Kaschel, 2020). This observation is in line with theoretical considerations with regard to the so-called 'common-enemy effect', stating that the confrontation with a common enemy (e.g., formed by nature, an individual, or a group) increases cooperation (Diamond, 2005; Henrich and Henrich, 2007; Ostrom et al., 1999). Empirical findings support the assumption that crises can bring out the best in people, showing that prosocial behavior increases in time of war (Bauer et al., 2016) as well as after terrorist attacks (Páez et al., 2007) and natural disasters (Rodriguez et al., 2006).

However, at the same time, individualistic and anti-social reactions have also been observed since the outbreak of the pandemic. Individuals ignored distance guidelines and caused shortages of basic necessities through stockpiling. These observations are consistent with another line of theory postulating that people become less prosocial during crises due to competition for rare resources (e.g., Dietz, 2003; Hardin, 1968). This is in line with studies showing that crises can bring out the worst in people by prompting selfish and antisocial behavior (e.g., Hsiang et al., 2013; Brancati, 2007).

Irrespective of the direction of the effect, both accounts suggest change (in form of increase or decrease) to prosocial behavior during crisis. This development is remarkable, as prosocial behavior is strongly determined by social value orientation (e.g., McClintock and Allison, 1989; Balliet et al., 2009) that has shown to be relatively stable over time and context (Murphy et al., 2011; Carlsson et al., 2014). Note that social value orientation is not only related to personality traits (Hilbig et al., 2014) but has proven to be a reliable predictor for real-life prosocial behavior — for example, in form of donations to charity (Van Lange et al., 2007).

With respect to this stability argument, it could be expected that prosociality measured as context-independent social value orientation remain relatively unaffected by the context, such as the environmental context, the COVID-19 pandemic. Following the same line of reasoning, pandemic-specific influence factors of the interaction (e.g., certain characteristics of the giver and recipient) should not affect levels of prosociality either.

1.1. Pandemic-specific context factors associated with prosocial behavior

Other evidence, however, also demonstrates a high degree of context sensitivity of prosocial behavior (e.g., Cuadrado et al., 2016; Decety et al., 2016; Chen and Li, 2009). It has repeatedly been shown that prosocial behavior depends on characteristics of the giver, the recipient, and their interpersonal relation. For instance, cross-cultural studies report that prosocial behavior depends on the individuals' social and political orientation (i.e., characteristic of the giver; Hellmann et al., 2021), the recipients' national background (i.e., characteristic of the recipient; Fiedler et al., 2018) or the similarity between givers and recipients (i.e., interpersonal characteristic; Froehlich et al., 2021). Furthermore, it has been shown that prosocial behavior increases with the recipient's socio-economic vulnerability in relation to the giver (economic inequality; Dorrough and Glöckner, 2016) and decreases with psychological distance towards (unidentified) recipients (Kogut et al., 2018), which can both be considered interpersonal characteristics.

In two incentivized studies, we investigate individuals' prosocial behavior during the COVID-19 crisis and examine pandemic-specific context factors that can be assumed to determine the interaction between giver (i.e., the person who behaves prosocially) and recipient (i.e., the person who benefits from the prosocial behavior). We test whether individuals' general prosociality (operationalized as social value orientation) changes — to the better or the worse — during the crisis as might be indicated by theoretical arguments and empirical evidence discussed above. Furthermore, we investigate the specific context sensitivity of prosocial behavior during COVID-19 using an additional measure (i.e., a Dictator game with varying recipients, details below). Specifically, we investigate the effect of (perceived) vulnerability of the recipient and the givers' perceived responsibility for helping the recipient by sharing monetary resources with them in anonymous interactions.

1.1.1. Perceived vulnerability of the recipient

Even though the COVID-19 virus does not differentiate according to social class, skin color, culture, or religion, there are specific risk groups that are particularly vulnerable to the virus, as they have a high risk to become severely ill or die from COVID-19. Statistics indicate that, in addition to pre-existing medical conditions, higher age and male gender can be crucial for the medical course of the disease, as mortality rates in the relevant population (i.e., Germany) are approximately ten times higher for people above the age of 60 and twice as high for males (Robert Koch-Institut, 2020). Most infected people appear to suffer a relatively benign disease and are thus exposed to lower risk themselves; however, they can still be carriers of the virus, potentially infecting vulnerable others.

In times of crisis, it is the people being most threatened who need the most support. Indeed, people tend to be especially willing to engage in prosocial behavior towards others who are perceived to be vulnerable and in need of help (e.g., Dorrough and Glöckner, 2016; Fisher and Ma, 2014; Kappes et al., 2018; Piston, 2014; Paulus, 2020). This tendency for increased prosocial behavior towards vulnerable (compared to less-vulnerable) others can even be observed in young children. Malti el al. (2016) showed that 4- and 8-year-old children shared more resources with recipients who were described as needy (i.e., have few toys or feel sad). Fundraising and humanitarian organizations often make use of this tendency by selecting images of children — the most vulnerable victims — for campaigns to evoke helping responses from prospective donors (Batson et al., 2005). The perception of vulnerability of another person can manifest itself in various manners from immediate suffering to potential future harm as well as in the form of economical, psychological, and physical (e.g., threat to health) vulnerability.

In a study on health care decisions, participants assessed hypothetical scenarios about deciding whether to go to work while sick. Willingness to stay home increased when going to work risked infecting an elderly co-worker who would suffer serious illness compared to a scenario in which a young, healthy co-worker would have only mild symptoms (Kappes et al., 2018). Thus, when others were perceived as vulnerable to an infectious disease, prosocial behavior was increased. In the present study, we applied the concept of vulnerability similar to the study of Kappes et al. (2018). More specifically, we define vulnerability as the degree to which people are threatened by the COVID-19 virus — i.e., have a high risk of becoming severely ill or dying from the virus.

According to Goodin (1986), vulnerability provides the key foundation for moral responsibility as we — as moral agents — have the responsibility to protect vulnerable others who are dependent on our

choices and actions. Thus, as a second context factor that might influence prosocial behavior in times of crisis, we focus on the interpersonal characteristic of perceived responsibility to help recipients.

1.1.2. Perceived responsibility of the giver

The concept of responsibility is of crucial importance in times of crisis. There is consensus that crises can only be solved if all responsible actors become aware of their responsibility and take appropriate action (e.g., Rendtorff, 2014; Peters, 2009). There is a great body of literature finding evidence for a relationship between perceived responsibility and prosocial behavior. Whereas different approaches emphasize different aspects of responsibility, results are consistent in that prosocial behavior increases when people perceive a high degree of moral obligation, duty, or personal responsibility to help others (e.g., Amato et al., 1984; Brañas-Garza, 2007; Bruttel and Stolley, 2018; D'Antonio, 2014; Erlandsson et al., 2015; Schwartz and Clausen, 1970; Yang et al., 2020). In the present study, we mainly focus on the individuals' perception of his/her own responsibility to show prosocial behavior. More specifically, we define perceived responsibility as the degree to which people feel responsible to help others. According to Schwartz (1973), ascribing responsibility to the self for a prosocial action represents an important antecedent of prosocial behavior. It has been shown that the more individuals ascribe responsibility to themselves, the more likely they are to translate their helping intentions into actual prosocial behavior (Godin et al., 2005; Zuckerman et al., 1977).

2. Study 1

The present research consists of two studies. In the first study, carried out in the early phase of the pandemic, German student participants had the opportunity to engage in prosocial behavior towards recipients that differed in terms of their vulnerability to COVID-19. The interactions were in principle anonymous, but the students received a limited amount of information on the recipients — i.e., age, gender, and whether they were suspected COVID-19 cases. This information provided a cue for their (actual) vulnerability to the virus. Participants indicated for each recipient the perceived vulnerability and their perceived responsibility to help him/her. Contrary to the assumption of stable social preferences (Murphy et al., 2011), but in line with insights from research presented above, we expect individuals' degree of general prosociality to be affected by the current COVID-19 pandemic. We thus hypothesize that individuals' degree of prosociality (as measured with the context-independent Social Value Orientation Slider) differs before vs. during the COVID-19 pandemic (H1). Since there are theoretical arguments and empirical evidence pointing in both directions (i.e., increase or decrease in prosociality), we pre-registered our study including the intention to conduct an undirected two-sided test against the null hypothesis. We further assume individuals' perceived responsibility to help and the recipients' vulnerability to the virus to be context-specific factors that determine prosocial behavior. We hypothesize that prosocial behavior (measured by a series of Dictator games with different recipients) increases with the perceived vulnerability of the recipient to COVID-19 (H2) and the participants' perceived own responsibility to help recipients with varying vulnerability (H3).

2.1. Method

The study was pre-registered[1] (see https://osf.io/g5sqd) and administered in combination with an unrelated second study on risk perception (Glöckner et al., 2020a). Instructions and data (including analysis script) are available at the Open Science Framework (https://osf.io/gbsf2/?view_only=106f215c0ee94b34b26c859bf6004eca).

2.1.1. Participants and design

Two hundred participants (141 female, mean age = 31 years) took part in the online study conducted from 03-17–2020 to 03-18-2020. The sample size was determined before data collection. We aimed for and collected 200 participants, since this would allow for the detection of small to medium-sized effects (Vazire, 2016) for regression coefficients (assumed $f^2 = .055$, one-sided test) with a power of $1 - \beta = .95$. Participants, mainly students but also persons from the general public, were recruited via the online recruitment system hroot (Bock et al., 2014). Participants required approximately 19 min to complete the combined study with the present study being the first presented. Payments were contingent on participants' (or an anonymous interaction partners') prosocial behavior during the study. After termination of the study, one of the incentivized tasks (Dictator game or Social Value Orientation Slider) was randomly selected as a basis for experimental payoff. Using a variant of the strategy method (e.g., Fischbacher et al., 2012), the payoff depended on one of the allocation decisions that was randomly selected[2]. Payments ranged from 0 to 10€ (average 6.52€, approx. USD7.10). Thirteen (7%) participants indicated that they had been (or were currently) considered COVID-19 suspect cases based on the official criteria at the time (i.e., after contact with infected persons or upon return from a risk area).

2.1.2. Materials

To investigate the effects of perceived vulnerability and responsibility on prosocial behavior, we asked participants to indicate prosocial behavior towards individuals from various groups that can be assumed to differ on these factors. Individuals from seven groups that differ in their vulnerability to COVID-19 according to official statistics (men more vulnerable than women; older people more vulnerable than younger people)[3] were presented to the participants. Six groups were defined on the basis of age and gender (women <40 years of age (Y/A), men <40 Y/A, women between 40 and 60 Y/A; men between 40 and 60 Y/A; women >60 Y/A, men >60 Y/A). An additional group consisted of persons that were COVID-19 suspect cases. Participants indicated (prosocial) behavior towards a recipient of each group. They were then asked to evaluate the recipients regarding their vulnerability and assess their own responsibility towards them. Note that — as we had planned — individuals from all seven groups (i.e., gender*age category; COVID-19 suspect case) were included in our sample. This allowed for the realization of the incentivized payment structure without deception.

2.1.2.1. Prosocial behavior. Our dependent variable prosocial behavior was measured in two ways. First, we used the Social Value Orientation Slider measure (SVO, Murphy et al., 2011) as a general (context-independent) measure for prosociality that was applied before (SVO1) and during (SVO2) the pandemic. The Social Value Orientation Slider consists of 15 decomposed Dictator games, for which participants had to choose between nine possible self/other payoff combinations. From the items, an SVO angle was calculated with higher values representing a higher level of prosociality. Based on the SVO angle, individuals can be categorized into certain SVO types with competitors, individualists, cooperators, and altruists being the most prominent ones.

[1] The pre-registration contained additional hypotheses concerning SVO, DG-giving and the interaction with perceived vulnerability. Results for these additional hypotheses are reported in the Appendix.

[2] In the instructions, we additionally gave an example for the payment structure "*If you allocate 3€ to a recipient, you receive a payment of 2€ and the recipient receives 3€*".

[3] https://de.statista.com/statistik/daten/studie/1039211/umfrage/sterblichkeit-durch-das-coronavirus-nach-altersgruppen-in-china/, https://de.statista.com/statistik/daten/studie/1102096/umfrage/mortalitaetsrate-des-coronavirus-nach-geschlecht/.

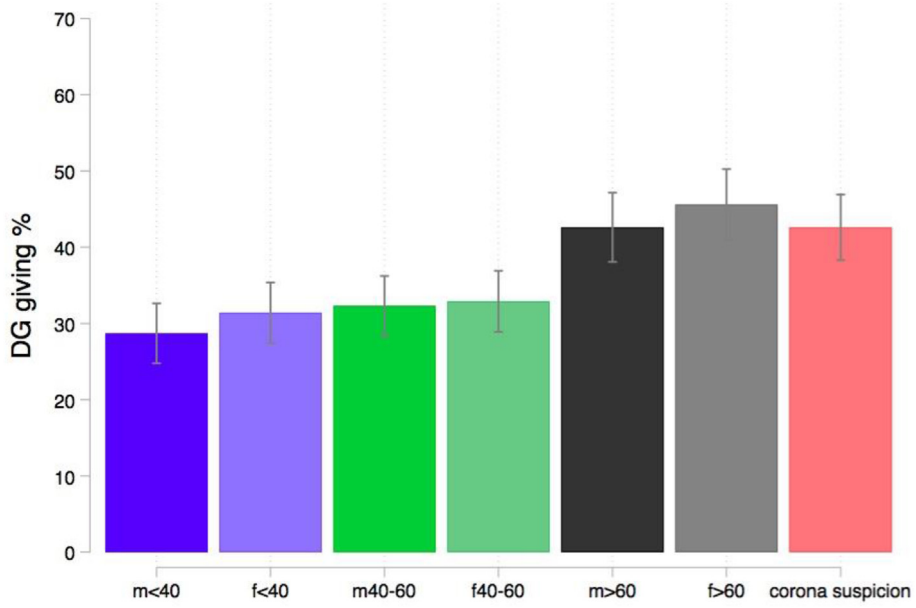

Figure 1. Dictator game (DG)-giving in percent for all recipient groups in Study 1. Error bars represent 95% confidence intervals (m = male, f = female, < under the age of, > over the age of).

SVO2 was included in the current study, SVO1 was measured several months before the crisis when participants registered in our lab. As a second measure, we used simple one-shot Dictator games (DG) to measure prosocial behavior towards different interaction partners. Participants received an initial endowment of 5.00€, which they could split between themselves (the dictator) and the other person (the recipient) in steps of 1.00€. Participants made seven DG decisions for each of the seven recipients in randomized order. Participants were informed that one of their decisions either from the SVO2 or the DG would be randomly selected to be relevant for their bonus payment.

2.1.2.2. Perceived responsibility. Perceived responsibility to help (PR) was measured with three items adapted from Erlandsson et al. (2015) on a 7-point Likert-scale from (1) "not at all" to (7) "very much" (e.g., "I have a personal responsibility to help *[a member of the respective group]* as much as I can"). For the analysis, we used the mean score over the three responsibility items ($M = 3.64$, $SD = 1.78$, $\alpha = 0.94$).

2.1.2.3. Perceived vulnerability. Using a single-item measure, participants were asked to evaluate the degree they perceived the respective groups to be threatened by the COVID-19 virus on a 7-point Likert-scale from (1) "not at all" to (7) "very much" ($M = 4.79$, $SD = 1.56$).

2.1.2.4. Individual characteristics. General personality factors including e.g., conscientiousness were measured using the German 100-item version of the HEXACO Personality Inventory-Revised (HEXACO-100; Lee and Ashton, 2018) additionally including four items for altruism from the full HEXACO-200 resulting in 104 items in total. General intelligence was measured with a 16-item, free, open access measure (ICAR16; $\alpha = 0.78$; Condon and Revelle, 2014). Cognitive reflection was measured using a 7-item version of the cognitive reflection test (CRT7; $\alpha = .75$; Toplak et al., 2011). General envy (benign vs. malicious) was measured using the German version of the Benign and Malicious Envy Scale (BeMaS; Lange and Crusius, 2015) with five items for benign (e.g., "I have warm feelings toward top performers", $\alpha = 0.86$) and four items for malicious[4] (e.g., "If other people have something that I want for myself, I wish to take it away from them.", $\alpha = 0.86$) envy. Additionally, we assessed individuals' religious belief with two items (e.g., "My religious or spiritual belief is very strong", $\alpha = 0.80$) and their social status (single, cohabiting, married/partnered, separated, divorced, widowed).

2.1.2.5. Further measures. To realize the incentivization and to control for personal exposure to COVID-19, we asked participants if they or a close acquaintance had been (or were currently) considered COVID-19 suspect cases as well as the extent to which they inform themselves about the current developments regarding COVID-19[5].

2.2. Results

All analyses were conducted in line with the pre-registration and necessary adjustments are made explicit. Additional analyses are provided as robustness checks. For directed hypotheses, we applied one-sided tests; for all other comparisons, we used two-sided tests. To account for the repeated measurement design (i.e., participants indicated how much money they would give to various groups) in testing H2 and H3, we applied mixed-effects models with random person intercepts.

Comparing general prosociality before and during the COVID-19 crisis, we see that participants were less prosocial prior to (SVO1: $M = 25.32$; $SD = 13.69$) than during (SVO2: $M = 27.67$; $SD = 13.15$) the crisis ($t(199) = -3.37$, $p < .001$)[6] in line with H1. The SVO distributions before and during the crisis significantly differ from each other as shown by the Kolmogorov-Smirnov test[7] ($p < .001$). See Appendix Figure A1 for a graphical comparison of the SVO distributions. We explored whether this shift in prosociality (i.e., differences SVO2 minus SVO1) can be explained

[4] Note that due to a technical problem one item of the malicious envy scale was missing for some participants. For these participants we calculated the internal consistency with four (instead of five) items.

[5] 32 participants (16%) indicated that a close acquaintance was a COVID-19 suspect. 90% of participants indicated that they informed themselves continually, indicating that they were aware of differences in peoples' vulnerability to the virus.

[6] A (non-parametric) Wilcoxon matched-pairs test leads to the same conclusion ($Z = -3.57$, $p < .001$).

[7] Note that we erroneously pre-registered an Eps-Singleton test (for independent samples). As we compare data on prosociality before and during the crisis using the same participants we report results of the more appropriate Kolmogorov-Smirnov test for dependent samples instead.

Table 1. DG-giving predicted by perceived vulnerability (PV), perceived responsibility (PR), and control variables (personal exposure, exposure of a close other, information about COVID-19 and SVO2).

	DG-giving				
	model 1	model 2	model 3	model 4	full model
PV	0.19***	0.19***			0.03^{+}
	(11.98)	(12.03)			(1.95)
PR			0.44***	0.43***	0.41***
			(24.37)	(24.02)	(19.83)
Controls:					
Personal		0.39		0.50	0.50
exposure		(1.23)		(1.61)	(1.62)
Close others'		-0.35		-0.25	-0.25
exposure		(-1.53)		(-1.11)	(-1.15)
Information		0.05		-0.02	-0.02
		(0.52)		(-0.17)	(-0.16)
SVO2		0.04***		0.03***	0.03***
		(6.12)		(4.40)	(4.51)
Constant	0.92***	-0.50	0.24*	-0.93	-1.01
	(7.78)	(-0.66)	(2.23)	(-1.27)	(-1.38)
BIC	3977.09	3968.507	3621.57	3628.75	3632.20
Observations	1400	1400	1400	1400	1400
Participants	200	200	200	200	200

Results of mixed-effects models with random person intercepts. Numbers refer to unstandardized regression coefficients and z statistics in parentheses, $^{+}$ $p < .10$ (for directed hypotheses and one-sided tests: p < .05), $^{*}p < .05$, $^{***}p < .001$, all stars indicate two-sided test results. SVO2 = prosociality during the crisis.

by individual characteristics such as personality traits, general intelligence, cognitive reflection, religiosity, social status or benign vs. malicious envy[8]. In the Bonferroni corrected analysis ($\alpha = .05/13 = .003$), however, none of the predictors reached conventional levels of significance (see Appendix Table A1, column 1).

With regard to the pandemic-specific context factors we find that participants showed different degrees of DG-giving (see Figure 1) towards different recipient groups. Similarly, perception of both, vulnerability (see Appendix, Figure A2) and responsibility (see Appendix, Figure A3) varied according to the recipient group (see Appendix, Table A2 for M and SD).

We investigated how the extent of prosocial behavior was affected by perceived vulnerability (PV) and perceived responsibility to help (PR). In line with H2, the effect of our first predictor perceived vulnerability on DG-giving was significant (see Table 1, model 1). This result holds when controlling for personal and close others' exposure to, information about COVID-19 and participant's general prosociality measured by SVO2 (see Table 1, model 2). The effect is substantially reduced but still significant in the full model including both predictors (see Table 1, full model). All effects (except for the effect of PV on DG-giving that did not reach significance in the full model) hold when running tobit regression analyses with random person intercepts (see Appendix, Table A3). Note that both predictors, perceived vulnerability and responsibility, were found to be substantially correlated, $r(199) = 0.36$, $p < .001$ (see Table A4 for a correlation table).

In line with H3, the effect of our second predictor perceived responsibility to help on DG-giving was also significant (see Table 1, model 3). When participants felt more responsible to help the recipient, they allocated more money towards that person. This effect proves to be robust, as it was also shown in the full model that controls for personal and close others' exposure to and information about COVID-19, participant's general prosociality measured by (context-independent) SVO2 and perceived vulnerability (see Table 1, full model). Note that there was a substantial correlation between our predictor perceived responsibility and individuals' general prosociality (SVO2), $r(199) = 0.20$, $p < .001$ (see Table A4).

An exploratory multi-level mediation analysis with bootstrapped standard errors (Krull and MacKinnon, 2001) revealed a significant indirect effect of perceived vulnerability on DG-giving via perceived responsibility to help ($coeff = 0.16$, $z = 8.96$, $p < .001$; bias-corrected CI.95 [0.13, 0.20]). Specifically, 85% of the total effect of perceived vulnerability on DG-giving is due to perceived responsibility to help (see Appendix, Figure A4 for the mediation model).

2.3. Discussion

Study 1 provides evidence that general prosociality — measured by context-independent SVO — changed significantly during the early COVID-19 crisis. This is in line with previous research on prosocial behavior during times of crisis (Bauer et al., 2016; Páez et al., 2007; Rodriguez et al., 2006). It is not so much in line with models assuming that prosociality is rather stable and insensitive to environmental factors. Our results show that the correlation of SVO1 and SVO2 is smaller ($r = 0.73$) than in previous attempts to measure retest reliability (Murphy et al., 2011, $r = .92$, but for a shorter time-interval of one week) indicating a substantial change in general prosociality before vs. during the crisis with people becoming more prosocial. A closer look at changes in SVO types prior to vs. during the crisis shows that only 12 (out of 200) participants changed SVO type, with 11 participants changing the category from individualist to cooperator and one from individualist to competitor and the great majority of participants being classified as cooperators at both points in time. Hence, changes in prosociality seem to be mainly gradual.

Furthermore, we showed that prosocial behavior measured by DG-giving was affected by context factors that are specific to the COVID-19 pandemic. Specifically, we found perceived vulnerability to COVID-19 as one characteristic of the recipient and perceived responsibility of the giver as one interpersonal characteristic to be predictors of prosocial behavior.

The reported study has limitations. Our recipient groups were defined in terms of age and gender to achieve variance in vulnerability to COVID-19. While the vulnerability for the elderly was at the center of the public debate, the role of gender was largely absent in the official communications. Thus, male gender might not have been a suitable cue for increased perceived vulnerability. Furthermore, according to findings in stereotype perception research, the information that someone belongs to a certain age or gender group is used to infer a wide range of properties concerning the person such as competence, warmth, and status (Fiske et al., 2002; Hentschel et al., 2019). Age and gender have indeed also been shown to be related to general prosociality (e.g., Engel, 2011; FeldmanHall et al., 2016). Hence, it is possible that our selection of groups was not optimal for investigating effects of perceived vulnerability of the recipient on prosocial behavior.

We conducted a second study that precluded these potential confounds by making the degree of recipients' vulnerability to the COVID-19 virus more explicit instead of using age and gender as indirect cues for vulnerability. Furthermore, since Study 2 was conducted at a later stage of the pandemic (with higher infection counts) we were able to include monetary allocations towards a COVID-19 infected group instead of a COVID-19 suspect group.

3. Study 2

In Study 2, we pursued two major objectives. That is with some methodological improvements, we (i) aimed to conceptually replicate

[8] Note that we pre-registered only 12 individual characteristics as potential predictors for the shift in SVO. As we measured envy with two separate variables (benign envy and malicious envy) we report results of 13 variables.

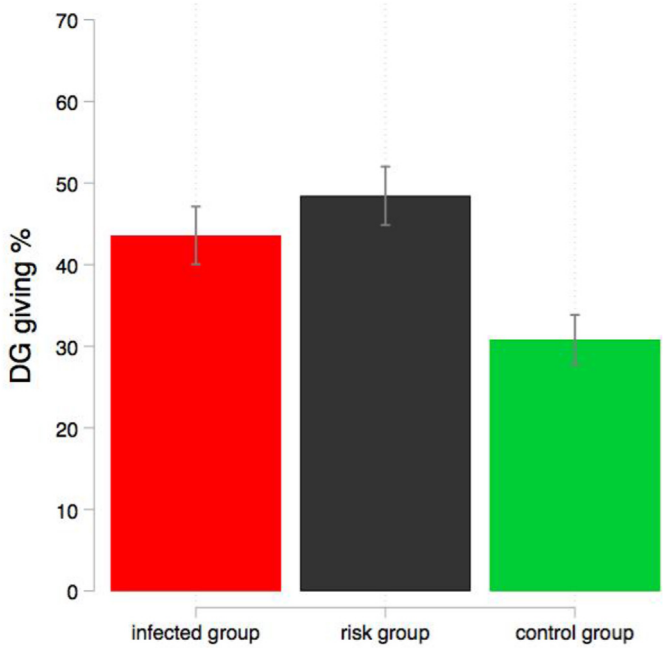

Figure 2. Dictator game (DG)-giving in percent for all groups of recipients (infected group, risk group control group) in Study 2. Error bars represent 95% confidence intervals.

our finding concerning the two pandemic-specific context factors influencing prosocial behavior — giver's responsibility and recipients' vulnerability to COVID-19 — using a representative sample (according to age and gender) of the German population. Furthermore, we (ii) aimed to investigate the factor responsibility in more detail. Specifically, we considered further responsible actors (in addition to the self) and further responsibility dimensions (in addition to perceived responsibility to help, PR) that might be relevant in the current pandemic.

Research shows that prosocial behavior is not only increased by high perceived responsibility of the giver but also by low perceived responsibility of the recipient (e.g., Basil et al., 2006; Rudolph et al., 2004). Furthermore, it has been shown that if a recipient is perceived to be responsible for his or her vulnerable circumstances, the willingness to help decreases (Weiner et al., 2011; Tscharaktschiew and Rudolph, 2016). In contrast, persons perceived as not responsible for their plight receive more help. For example, participants are more supportive of welfare for people who are in need because of unexpected and uncontrollable events than for people who are in need due to their own decisions (Petersen et al., 2011). The recipients' responsibility can be subdivided into the responsibility for the cause of and the solution to their problem (Brickman et al., 1982). In the current COVID-19 pandemic, responsibility is an intensely debated topic. On the one hand, many people are highly aware of their personal responsibility for containing the spread of the virus and for contributing to finding a way out of the crisis (Connolly, 2020). On the other hand, many people emphasize the responsibility of politicians to bring the country out of the crisis and governments are harshly criticized for their slow response (Rutter, 2020).

Assigning responsibility to other involved actors can lead to a decrease in prosocial behavior as a result of a diffusion of responsibility in that the presence of other potential help-givers leads individuals to feel that they are personally less responsible (Darley and Latane, 1968; Cryder and Loewenstein, 2012; Schwartz and Clausen, 1970).

In a previous, unpublished dataset, we investigated the role of different responsibility dimensions (PR, PR-C, PR-S) on prosocial behavior towards social groups in need (e.g., refugees). We found all responsibility dimensions to uniquely influence prosocial behavior.

Table 2. DG-giving predicted by perceived responsibility to help (PR), perceived responsibility for the problem cause (PR-C) and solution (PR-S) with regard to the different responsible actors (self, recipient, politicians).

	DG-giving		
	model 1 (H2a-c)	model 2 (H3a-c)	model 3 (H4a-c)
PR_self	0.19***		
	(6.63)		
PR-C_self	-0.05		
	(-0.93)		
PR-S_self	0.05		
	(0.92)		
PR_recipient		0.01	
		(0.32)	
PR-C_recipient		-0.07*	
		(-2.39)	
PR-S_recipient		0.01	
		(0.27)	
PR_politicians			0.20***
			(6.34)
PR-C_politicians			-0.10*
			(-2.28)
PR-S_politicians			-0.05
			(-0.80)
Constant	1.08***	2.16***	1.60***
	(4.70)	(10.98)	(4.12)
BIC	2979.75	3025.20	2987.28
Observations	903	903	903
Participants	301	301	301

Results of mixed-effects models with random person intercepts. Numbers refer to unstandardized regression coefficients and z statistics in parentheses, *$p < .05$, ***$p < .001$, all stars indicate two-sided test results.

Donations increased with participants' perceived responsibility to help, whereas they decreased when participants perceived recipients to be responsible for the problem cause (PR-C) and solution (PR-S). Based on these insights of research on responsibility and prosocial behavior, we derive hypotheses (H2–H4, details see below) for various actors involved (self, recipient, politicians) and on how different dimensions of responsibility (PR, PR-C, PR-S) affect prosocial behavior in the current COVID-19 pandemic. We furthermore aimed at conceptually replicating the result of Study 1 — i.e., that prosocial behavior is sensitive to pandemic-specific factors of responsibility and vulnerability.

We expect that prosocial behavior differs across recipients with increased giving towards recipients from the control group, risk group, and recipients being infected with COVID-19 (following this ranking[9]) (H1). Furthermore, it is assumed that prosocial behavior increases with the participant's own perceived responsibility (H2), as indicated by the responsibility to help (PR_self, H2a), responsibility for the problem cause (PR-C_self, H2b), and problem solution (PR-S_self, H2c).

Prosocial behavior is expected to decrease with the perceived responsibility of the recipient as indicated by the responsibility to help him- or herself (PR_recipient, H3a), responsibility for the problem cause (PR-C_recipient, H3b), and problem solution (PR-S_recipient, H3c). Finally, it ias hypothesized that prosocial behavior decreases with the perceived responsibility of politicians as indicated by the responsibility to help

[9] This ranking was based on the finding of Study 1 that suspect cases received as much money as recipients from the oldest age category ($b = -0.08$, $z = -1.25$, $p = .211$) and the assumption that participants would assign more responsibility towards infected compared to suspect cases (perceiving them as more vulnerable).

(PR_politicians, H4a), responsibility for the problem cause (PR-C_politicians, H4b), and problem solution (PR-S_politicians, H4c).

3.1. Method

The second pre-registered study (see https://osf.io/smh8f) was part of the COVID-19 battery of the Social Cognition Center Cologne, that included six studies (Dohle et al., 2020; Glöckner et al., 2020a, 2020b; Imhoff and Lamberty, 2020; Schneider et al., 2021). All materials and data are stored at OSF (see https://osf.io/q9vf3/?view_only=fc0a7baa963f4afaabbb08c2a8072956). Study 2 serves as a conceptual replication of Study 1 with the following major changes: While responsibility was assessed in a more detailed and systematic way including different responsible actors (self, recipient, politicians) and different responsibility dimensions (responsibility to help, responsibility for problem cause and solution), vulnerability was not measured. Instead, we defined three recipient groups with varying vulnerability to COVID-19 that participants made evaluations of and allocations decisions for.

3.1.1. Participants

301 participants (156 female, 1 diverse, mean age = 50 years) took part in the online study conducted from 04-29–2020 to 05-04-2020. Participants were recruited and incentivized via the professional online panel provider Toluna (https://de.toluna.com/#/). The sample was representative for the German adult population according to gender and age. For gender, that means that the proportion of women in our sample reflects the proportion of women in the German population. Representativeness concerning age was realized with the following four age categories: 18–24; 25–39; 40–54; 55–99. If a certain age or gender category was full, participants with the respective criteria were excluded from participation. Income, occupation, and education were broadly distributed. We aimed for 300 participants since this would allow for detecting small effects for regression coefficients (assumed $f^2 = 0.036$, one-sided test) with a power of $1 - \beta = .95$. Participants required approximately 25 min. completing the entire test battery. They were compensated with a basis payment of 4.00€ plus an incentivized bonus of 0–3.00€ contingent on their or an anonymous interaction partner's behavior. Earnings ranged from 4.00€ to 7.00€ (average 5.83€, approx. USD6.77). Of the participants, 84% indicated that they continually informed themselves about COVID-19, which was similar to Study 1. 5% indicated that they had been suspected of or tested positive for COVID-19. 2% (7 participants) had been diagnosed with COVID-19, 1% (3 participants) indicated that they were currently active COVID-19 cases. As anticipated, this enabled us to realize the incentivized payment structure without deception.

3.1.2. Materials

Each participant indicated prosocial behavior and answered questions regarding perceived responsibility towards recipients from three different groups with varying vulnerability to COVID-19. These involved a person infected with COVID-19 (infected group), a person at high-risk (older adults and people having serious underlying medical conditions; risk group), and a random person participating in this study (control group) in randomized order. Group membership was the only information provided concerning the other person in the otherwise anonymous interaction.

3.1.2.1. Prosocial behavior. Our dependent measure again consisted of simple, one-shot Dictator games. Due to adjustments to Toluna's average payment for participation, the initial endowment was reduced compared to Study 1 (3€ rather than 5€). To maintain the allocation structure, payment was framed as points using a conversion rate of 1 point = 0.60€. Participants received an initial endowment of 5 points from which they could give the recipient any amount in steps of 1 point (including 0 points). Participants were informed that either one randomly selected decision made by themselves as the dictator or a decision made by another participant for them as the recipient could be relevant for their bonus payment.

3.1.2.2. Perceived responsibility. In Study 2, the concept of perceived responsibility was extended in two ways. First, perceived responsibility to help (PR), measured with the same items as in Study 1, was supplemented by ratings for two other actors — namely the recipient (e.g., "a person infected with COVID-19 has a personal responsibility to help her/himself as much as she/he can") and politicians (e.g., "politicians have a responsibility to help a person infected with COVID-19 as much as they can"). Second, we measured perceived responsibility for the problem cause (PR-C) and solution (PR-S) with three items for each concept adapted from Kloss and Lisman (2003). Participants rated the extent to which they perceive the different actors (the self, politicians, and recipients from the infected, risk, random group) to be responsible for the problem cause (e.g., "A person infected with COVID-19 is partly responsible for the COVID-19 crisis in Germany") and solution (e.g., "I am partly responsible for creating a solution for the COVID-19 crisis in Germany") on a 7-point Likert-scale (agreement: (1) "very low" to (7) "very high"). In sum, we obtained three concepts of perceived responsibility (PR to help, PR-C, and PR-S) resulting in 19 observations for perceived responsibility for each participant. For PR we had nine observations per participant (three actor groups: self, recipient, politicians; three recipient groups: infected, risk, control). PR-C and PR-S was each assessed for five groups (i.e., self, politicians, infected, risk, control). Perceived responsibility was in all cases measured with three items, from which we calculated the mean (all $\alpha \geq 0.74$).

3.1.2.3. Further measures. To realize incentivization and control for participants' COVID-19 status in the analyses, we asked participants if they or close others have been or were currently diagnosed with COVID-19, if they got tested or if they belonged to a high-risk group. This information was voluntary and obtained in addition to the control questions from Study 1.

3.2. Results and discussion

To test hypotheses H1–H4, we again applied mixed-effects models with random person intercepts to account for the repeated measurement design. In line with H1, we observed that the levels of prosocial behavior differed substantially between recipient groups (see Figure 2). As expected, the control group received significantly less in the DG compared to the risk (b = -0.88, z = -13.12, $p < .001$) and the infected group (b = -0.64, z = -9.50, $p < .001$). However, contrary to our expectations (see Footnote 9), the risk group received significantly more allocations compared to the infected group ($b = 0.24$, $z = 4.31$, $p < .001$).

There were also substantial differences in perceived responsibility (PR to help, PR-C, PR-S) regarding both the different recipient groups (infected, risk, control group) and the different responsible actors (self, recipient, politicians). Descriptive statistics are provided in Table A5 and Figures A5-A7. Regarding PR to help and PR-C, participants rated politicians as most and themselves as least responsible. Politicians were also perceived as most responsible for PR-S. Interestingly, participants perceived themselves to be more responsible for finding a solution than the control group (and the risk group), while perceiving the infected group to be equally responsible.

To systematically investigate the effect of perceived responsibility on prosocial behavior and test H2–H4, we regressed prosocial behavior on PR to help, PR-C, and PR-S separately for different actors (self, recipient,

politicians). The results for the respective models are provided in Table 2. As a check for robustness of the results, we rerun the analyses (1) controlling for participants' status of and exposure to COVID-19 (see Appendix, Table A6) and (2) using a tobit regression with random person intercepts (see Appendix, Table A7). Note that all identified predictors remained significant in these additional analyses supporting the robustness of our results.

In addition to these pre-registered analyses, we report a full model in Table A8 including all responsibility variables simultaneously. We see the full model as a further robustness check of the results of our pre-registered individual analyses as all identified predictors remain significant (except for the effect of PR-C_politicians on prosocial behavior that did not reach significance any more), thus supporting the assumption that they uniquely predict variation in prosocial behavior. Note that in the full model we found support for further hypothesized effects that were not significant in the individual analyses (see Table A8). These differences between the (pre-registered) individual analyses and the overall analysis might be driven by complex and in some cases high correlations between the individual responsibility predictor variables (see Appendix Table A9). Consequently, the effects being only significant in the full model need to be interpreted cautiously. We report results of both analyses, but rest our main conclusions on the individual level analyses as pre-registered.

3.2.1. Participants as responsible actors

Replicating the results of Study 1 and in support of H2a, prosocial behavior increased with PR_self. However, there was no support for H2b and H2c, as PR-C_self and PR-S_self did not lead to an increase in prosocial behavior (see Table 2, model 1). Note that in the full model, the effect of PR-S_self on DG-giving was significant (see Appendix Table A8).

3.2.2. Recipients as responsible actors

In line with H3b, participants allocated less money the more they perceived the recipient to be responsible for the problem cause (PR-C_recipient). However, PR_recipient and PR-S_recipient did not predict allocations, providing no support for H3a and H3c (see Table 2, model 2). Note that in the full model, the effect of PR-S_recipient on DG-giving was significant (see Appendix Table A8).

3.2.3. Politicians as responsible actors

As expected (H4b), participants allocated less money the more responsible they perceived politicians to be for the problem cause (see Table 2, model 3). However, PR-S_politicians did not affect allocation rates, providing no support for H4c. PR_politicians was also a significant predictor of DG-giving, but in the opposite direction as expected (H4a). The more responsibility to help participants assigned to politicians, the more money they allocated towards recipients. In this respect it should be noted that we found a significant positive correlation between PR_self and PR_politicians ($r(901) = 0.37$, $p < .001$).

In an additional analysis, we further explored if the reported effects of responsibility on prosocial behavior vary between the different recipient groups (infected group, risk group, control group). This analysis included the interaction terms between the responsibility variables and the recipient groups contrasting the control group against the infected and the risk group (see Appendix Table A10). We found significant main effects for PR_self, PR_cause and recipient group on prosocial behavior that are in line with the results reported above. In addition, we found a significant interaction between recipient group and PR_self. For recipients of the infected group ($b = 0.09$, $z = 2.21$, $p < .05$) and the risk group ($b = 0.09$, $z = 2.18$, $p < .05$), the effect of individuals' perceived responsibility to help (PR_self) on prosocial behavior was stronger compared to the control group. We further found a marginal negative significant interaction effect of infected*PR_cause on prosocial behavior ($b = -0.09$, $z = -1.95$, $p < .10$). For the infected group, the effect of PR_cause on prosocial behavior tended to be reduced compared to the control group but did not reach conventional significance levels.

4. General discussion

In two studies, we investigated prosocial behavior in times of the COVID-19 pandemic. Study 1 provides evidence that general prosociality — measured as context-independent SVO (social value orientation) — did significantly increase during the early stage of the pandemic as compared to before the pandemic. This extends previous research showing increases in prosocial behavior during times of crisis in general (Bauer et al., 2016; Páez et al., 2007; Rodriguez et al., 2006). It is not in line with theoretical accounts assuming that SVO — representing a dispositional trait measure for prosociality — is rather stable and should therefore be relatively insensitive to environmental factors (Murphy et al., 2011). This result is particularly remarkable since we did not introduce any pandemic context before participants answered the SVO items. A particular advantage of the SVO Slider measure is that it is presented without any context (e.g., Kuhlman et al., 1986). This also means that context effects are more difficult to find than when using context-specific measures for prosociality (i.e., scenarios with helping behavior that is practically more relevant for a pandemic such as sharing germicide) that may be more sensitive to detect changes in prosociality during the pandemic. However, it remains unclear if we deal with a long-term change in prosociality or rather a temporary phenomenon similar to a state of prosociality. Based on previous research, we know that changes in personality traits typically occur not at all or only slowly whereas sudden changes are rather rare (e.g., Roberts et al., 2006). Our data were collected during a relatively early stage of the pandemic (17/18 March 2020) when people started to realize the immense threat to the world in general and to their own and their fellow humans' lives in particular towards which they might have reacted with increased prosociality. Further research is needed to investigate if these effects hold during the course of the crisis and thereafter.

Prosociality is a highly relevant topic in the COVID-19 pandemic. Multiple studies have been conducted to investigate the pandemic's effects on prosocial behavior in different economic games. The respective results are rather inconclusive: Comparing pre-pandemic data with data gathered at five points in time covering six weeks after the city's lockdown in Wuhan, China, Shachat et al. (2020) observed an increase in prosociality along with the exposure to the pandemic. Brañas-Garza et al. (2020) reported a decrease in prosocial behavior in Spain during a six-day period in which COVID-19-associated deaths increased fourfold. Bilancini et al. (2020) did not find an effect of norm-based interventions on individual pandemic response. These mixed findings indicate complex effects on prosocial behavior, which might vary between context, cultures and points in time. More studies are needed that investigate whether a change in prosociality during a crisis is rather a short-term or a long-term phenomenon.

Besides a shift in general prosociality, we identified pandemic-specific context factors for prosocial behavior measured by a series of Dictator games. Specifically, we showed that levels of prosocial behavior were associated with the giver's responsibility and the recipients' vulnerability to COVID-19, which is in line with previous research. Previous research (e.g., D'Antonio, 2014; Amato et al., 1984; Fisher and Ma, 2014; Kappes et al., 2018; Yang et al., 2020) using comparable methods found large effects ($d = 0.94$ to $d = 1.25$) of giver's responsibility to help on prosocial behavior and moderate effects ($d = 0.31$ and $d = 0.57$) of the recipients' vulnerability on prosocial behavior. Our effects ($d = 1.01$ and $d = 0.43$) fall in these ranges of effect sizes, speaking for the generalizability of these effects to the pandemic (in direction and size).

One could argue that the relationship between the recipients' vulnerability and prosocial behavior could be moderated by the consequences of the performed prosocial behavior for the recipient. In line with results of Public Good games showing that higher multiplication factors (i.e., increased profitability) lead to higher proportions of contributions (Isaac et al., 1994), it seems even more rational to act prosocially towards more (compared to less) vulnerable recipients, as they receive greater benefits from the prosocial act. Thus, future research

could include the perceived degree of benefits for vulnerable recipients as an additional factor.

In Study 2, we further showed that, for different actors, different responsibility dimensions relate to prosocial behavior. For actors other than the self, perceived responsibility for the cause (but not for the solution) of the problem predicted prosocial behavior. This is particularly interesting, as past research indicated perceived responsibility for the problem solution to have a greater impact on helping than perceived responsibility for the problem cause (Karasawa, 1991). However, our findings suggest that perceived responsibility for the problem cause assigned to recipients and politicians is particularly relevant in the COVID-19 crisis, as it decreases prosocial behavior. Interestingly, participants indicated much lower perceived responsibility for the problem cause to themselves compared to all other actors (even to random recipients). This is in line with the finding that people evaluate themselves more positively compared to others (Alicke et al., 1995; Zell et al., 2020). This overconfidence is also observed in the current COVID-19 pandemic, as people assume that they do more than others to avoid infection (Glöckner et al., 2020a) and that their financial well-being will be less negatively affected by the pandemic as compared to the national and global economy (Barrafrem et al., 2020).

Another important result is that assigning responsibility to help to politicians did not decrease but, instead, increased individuals' prosocial behavior. A decrease could be expected from findings on the diffusion of responsibility (e.g., Darley and Latane, 1968). Instead, the more people think politicians, as their elected representatives, should assume responsibility to help, the more responsible to help they feel themselves and the more they actually help. In line with research on behavior change (Valente and Pumpuang, 2007), this seems to imply that participants might follow the example of responsible political leaders that act as role models for responsible behavior.

There are several methodological limitations of our study design. Our studies did not involve experimental manipulations for responsibility. Hence, it is not possible to derive claims concerning the causal direction of the observed effects. For future studies, it would therefore be interesting to manipulate the degree of responsibility towards different actors in times of crisis. A further methodological limitation of our study is that we only randomize the order of the items within a task but not the order of the different tasks. To avoid carry over effects we decided to measure our dependent variable (DG-giving) first. In retrospect, however, it would have been a better decision to further randomize the order of the dependent (DG-giving) and independent (perceived responsibility) variables to entirely exclude the possibility of demand effects. Furthermore, one could criticize our multiple Dictator game design as past research showed sequence effects with previous allocation decisions affecting current decisions (see, for example, the phenomena of moral cleaning and moral self-licensing, Brañas-Garza et al., 2013). However, we used a variant of the well-established strategy method for the realization of the incentivized payment structure with only one randomly selected decision being relevant for participants' payment. This represents not only an economic way of collecting data, but also an effective way to neutralize sequence effects as each decision should be regarded as the only decision made. Empirical evidence supports the validity of the strategy method in economic games showing that allocations do not differ between the strategy method and the direct response method (e.g., Fischbacher et al., 2012; Brandts and Charness, 2011). As a further limitation, we must critically note that we did not measure perceived vulnerability in Study 2 since we set a clear focus on perceived responsibility and its different dimensions. Instead, we presupposed a vulnerability (and responsibility) ranking (control < risk < infected) for the three recipient groups (see H1). We based this ranking on the result of Study 1 that suspect cases received as much money as recipients from the oldest age category and the assumption that participants would assign more responsibility towards infected compared to suspect cases (perceiving them as more vulnerable). In retrospect, the ranking (control < infected < risk) would have been more appropriate. The risk group should be perceived as more vulnerable since it — by definition — consists of older adults and people having serious underlying medical conditions with a high risk of becoming severely ill or dying from COVID-19 while the infected group consists of individuals with varying age and severity of the disease. In line with that, the results clearly show that participants assumed more responsibility and gave more allocations towards the risk group (compared to the infected group). However, even though our hypothesized ranking did not show, we succeeded in our prime objective which was to produce variance between groups regarding DG giving and perceived responsibility. Consequently, the "false ranking" in H1 did not affect our analyses and conclusions for the remaining hypotheses.

In sum, our findings provide important insights for policymakers who wish to promote prosocial behavior in the current pandemic and beyond: Highlighting individual responsibility and emphasizing the vulnerability of the recipient could be promising ways to increase prosocial behavior. This might be accomplished by information campaigns about the risks and consequences for people that are particularly vulnerable to COVID-19.

Based on our result that prosocial behavior was increased with both, perception of one's own and politicians' responsibility to help, it should be emphasized that joint forces are needed to overcome this crisis. A recent study showed the increased use of Twitter by state leaders during the COVID-19 pandemic and its large impact on the public (Haman, 2020). Consequently, social media seem to be the central medium to increase awareness of individuals' responsibility for prosocial behavior. Our finding that assigning high degrees of perceived responsibility for the problem cause to other actors reduces prosocial behavior points to the problems coming along with a politicization of COVID-19 such as increased discrimination and stigmatization (He et al., 2020; Bruns et al., 2020).

It should be taken into account that the results obtained in these studies are based on German participants only. This pandemic, however, is a global phenomenon, which arguably has a different impact on the individual countries around the globe. Even though Germany had a comparatively high number of COVID-19 infections, it is a country with a strong economy and a well-established social system that might recover more quickly from this crisis than less developed or developing countries that will feel the long-term effects more strongly. Cross-cultural research is needed to deeply understand these factors that influence individuals' (prosocial) behavior. With regard to our finding that responsibility and vulnerability are important drivers of prosocial behavior during the COVID-19 pandemic, it would be particularly interesting to replicate our study in countries that have similar infection numbers, but differ from Germany in political, economic, cultural and social aspects e.g., in terms of social inequality, collectivistic vs. individualistic tendencies or culturally based differences in social and moral responsibility. With the Dictator game being a widely used and validated experimental instrument to measure prosocial behavior in different cultural contexts (e.g., Dorrough and Glöckner, 2016; Fiedler et al., 2018; Henrich et al., 2005) it seems promising to apply our methodology in different nations to learn more about cross-cultural differences and similarities in prosocial behavior during COVID-19 and other crises.

In sum, the results of this research can help to define what we need to focus on to increase prosocial behavior in times of crisis. With his call on shared responsibility and global solidarity for the most vulnerable, according to our results, Secretary-General António Guterres has found exactly the right words to promote prosocial behavior in the current COVID-19 pandemic.

Declarations

Author contribution statement

Dshamilja Marie Hellmann: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Performed the experiments; Wrote the paper.

Angela Rachael Dorrough: Conceived and designed the experiments; Performed the experiments; Contributed reagents, materials, analysis tools or data; Supervized the writing process.

Andreas Glöckner: Conceived and designed the experiments; Supervized the writing process.

Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability statement

Data associated with this study has been deposited at Open Science Framework under - Study 1: https://osf.io/gbsf2/?view_only=106f215c0ee94b34b26c859bf6004eca and Study 2: https://osf.io/q9vf3/?view_only=fc0a7baa963f4afaabbb08c2a8072956.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

Supplementary content related to this article has been published online at https://doi.org/10.1016/j.heliyon.2021.e08041.

References

Alicke, M.D., Klotz, M.L., Breitenbecher, D.L., Yurak, T.J., Vredenburg, D.S., 1995. Personal contact, individuation, and the better-than-average effect. J. Pers. Soc. Psychol. 68, 804–825.

Amato, P.R., Ho, R., Partridge, S., 1984. Responsibility attribution and helping behaviour in the Ash Wednesday bushfires. Aust. J. Psychol. 36 (2), 191–203.

Balliet, D., Parks, C., Joireman, J., 2009. Social value orientation and cooperation in social dilemmas: a meta-analysis. Group Process. Intergr. Relat. 12 (4), 533–547.

Barrafrem, K., Västfjäll, D., Tinghög, G., 2020. Financial well-being, COVID-19, and the financial better-than-average-effect. J. Behav. Experi. Finance 28, 100410.

Basil, D.Z., Ridgway, N.M., Basil, M.D., 2006. Guilt appeals: the mediating effect of responsibility. Psychol. Market. 23 (12), 1035–1054.

Batson, C.D., Lishner, D.A., Cook, J., Sawyer, S., 2005. Similarity and nurturance: two possible sources of empathy for strangers. Basic Appl. Soc. Psychol. 27 (1), 15–25.

Bauer, M., Blattman, C., Chytilová, J., Henrich, J., Miguel, E., Mitts, T., 2016. Can war foster cooperation? J. Econ. Perspect. 30 (3), 249–274.

Bilancini, E., Boncinelli, L., Capraro, V., Celadin, T., Di Paolo, R., 2020. The effect of norm-based messages on reading and understanding COVID-19 pandemic response governmental rules. arXiv:2005.03998.

Bock, O., Baetge, I., Nicklisch, A., 2014. hroot: hamburg registration and organization online tool. Eur. Econ. Rev. 71, 117–120.

Brañas-Garza, P., 2007. Promoting helping behavior with framing in dictator games. J. Econ. Psychol. 28 (4), 477–486.

Brañas-Garza, P., Bucheli, M., Espinosa, M.P., García-Muñoz, T., 2013. Moral cleansing and moral licenses: experimental evidence. Econ. Philos. 29 (2), 199–212.

Brañas-Garza, P., Jorrat, D., Alfonso-Costillo, A., Espin, A.M., García, T., Kovářík, J., 2020. Exposure to the Covid-19 pandemic and generosity. PsyArXiv. https://mpra.ub.uni-muenchen.de/103389/.

Brancati, D., 2007. Political aftershocks: the impact of earthquakes on intrastate conflict. J. Conflict Resolut. 51 (5), 715–743.

Brandts, J., Charness, G., 2011. The strategy versus the direct-response method: a first survey of experimental comparisons. Exp. Econ. 14 (3), 375–398.

Brickman, P., Rabinowitz, V.C., Karuza, J., Coates, D., Cohn, E., Kidder, L., 1982. Models of helping and coping. Am. Psychol. 37 (4), 368–384.

Bruns, D.P., Kraguljac, N.V., Bruns, T.R., 2020. COVID-19: facts, cultural considerations, and risk of stigmatization. J. Transcult. Nurs. 31 (4), 326–332.

Bruttel, L., Stolley, F., 2018. Gender differences in the response to decision power and responsibility—framing effects in a dictator game. Games 9 (2), 28.

Carlsson, F., Johansson-Stenman, O., Nam, P.K., 2014. Social preferences are stable over long periods of time. J. Publ. Econ. 117, 104–114.

Chen, Y., Li, S.X., 2009. Group identity and social preferences. Am. Econ. Rev. 99 (1), 431–457.

Condon, D.M., Revelle, W., 2014. The international cognitive ability resource: development and initial validation of a public-domain measure. Intelligence 43, 52–64.

Connolly, J., 2020, May 1. Public Attitudes and the Management of the COVID-19 Crisis: the Importance of Personal Responsibility. https://blogs.lse.ac.uk/politicsandpolicy/personal-responsibility-covid-19/. (Accessed 12 March 2021).

Cryder, C.E., Loewenstein, G., 2012. Responsibility: the tie that binds. J. Exp. Soc. Psychol. 48 (1), 441–445.

Cuadrado, E., Tabernero, C., Steinel, W., 2016. Determinants of prosocial behavior in included versus excluded contexts. Front. Psychol. 6, 2001.

D'Antonio, J., 2014. The role of diffusion of responsibility, responsibility, and attitude in willingness to donate to a world hunger-related charity. Int. Rev. Publ. Nonprofit Mark. 11 (1), 1–11.

Darley, J.M., Latané, B., 1968. Bystander intervention in emergencies: diffusion of responsibility. J. Pers. Soc. Psychol. 8 (4), 377–383.

Decety, J., Bartal, I.B.A., Uzefovsky, F., Knafo-Noam, A., 2016. Empathy as a driver of prosocial behaviour: highly conserved neurobehavioural mechanisms across species. Philos. Trans. R. Soc. Lond. B Biol. Sci. 371 (1686), 20150077.

Diamond, J.M., 2005. Collapse: How Societies Choose to Fail or Succeed. Viking, New York.

Dietz, T., 2003. The struggle to govern the commons. Science 302 (5652), 1907–1912.

Dohle, S., Wingen, T., Schreiber, M., 2020. Acceptance and adoption of protective measures during the COVID-19 pandemic: the role of trust in politics and trust in science. Soc. Psychol. Bull. 15 (4), 1–23.

Doré, B.P., Morris, R.R., Burr, D.A., Picard, R.W., Ochsner, K.N., 2017. Helping others regulate emotion predicts increased regulation of one's own emotions and decreased symptoms of depression. Pers. Soc. Psychol. Bull. 43 (5), 729–739.

Dorrough, A.R., Glöckner, A., 2016. Multinational investigation of cross-societal cooperation. Proc. Natl. Acad. Sci. Unit. States Am. 113 (39), 10836–10841.

Engel, C., 2011. Dictator games: a meta study. Exp. Econ. 14 (4), 583–610.

Erlandsson, A., Björklund, F., Bäckström, M., 2015. Emotional reactions, perceived impact and perceived responsibility mediate the identifiable victim effect, proportion dominance effect and in-group effect respectively. Organ. Behav. Hum. Decis. Process. 127, 1–14.

FeldmanHall, O., Dalgleish, T., Evans, D., Navrady, L., Tedeschi, E., Mobbs, D., 2016. Moral chivalry: gender and harm sensitivity predict costly altruism. Soc. Psychol. Person. Sci. 7 (6), 542–551.

Fiedler, S., Hellmann, D.M., Dorrough, A.R., Glöckner, A., 2018. Cross-national in-group favoritism in prosocial behavior: evidence from Latin and North America. Judgm. Decis. Mak. 13 (1), 42–60. https://psycnet.apa.org/record/2018-09269-004.

Fischbacher, U., Gächter, S., Quercia, S., 2012. The behavioral validity of the strategy method in public good experiments. J. Econ. Psychol. 33 (4), 897–913.

Fisher, R.J., Ma, Y., 2014. The price of being beautiful: negative effects of attractiveness on empathy for children in need. J. Consum. Res. 41 (2), 436–450.

Fiske, S.T., Cuddy, A.J., Glick, P., Xu, J., 2002. A model of (often mixed) stereotype content: competence and warmth respectively follow from perceived status and competition. J. Pers. Soc. Psychol. 82 (6), 878.

Froehlich, L., Dorrough, A.R., Glöckner, A., Stürmer, S., 2021. Similarity predicts cross-national social preferences. Soc. Psychol. Person. Sci.

Glöckner, A., Dorrough, A.R., Wingen, T., Dohle, S., 2020a. The perception of infection risks during the early and later outbreak of COVID19 in Germany: consequences and recommendations. PsyArXiv.

Glöckner, A., Dorrough, A.R., Michels, M., Giersch, D., 2020b. Personality, Dread and Adherence to Governmental Measures in the COVID19 Pandemic in preparation.

Godin, G., Conner, M., Sheeran, P., 2005. Bridging the intention–behaviour gap: the role of moral norm. Br. J. Soc. Psychol. 44 (4), 497–512.

Goodin, R.E., 1986. Protecting the Vulnerable: A Re-analysis of Our Social Responsibilities. University of Chicago Press, Chicago.

Haman, M., 2020. The use of Twitter by state leaders and its impact on the public during the COVID-19 pandemic. Heliyon 6 (11), e05540.

Hardin, G., 1968. The tragedy of the commons. Science 162 (3859), 1243–1248.

He, J., He, L., Zhou, W., Nie, X., He, M., 2020. Discrimination and social exclusion in the outbreak of COVID-19. Int. J. Environ. Res. Publ. Health 17 (8), 2933.

Hellmann, D.M., Fiedler, S., Glöckner, A., 2021. Altruistic Giving Toward Refugees: Identifying Factors That Increase Citizens' Willingness to Help. Front. Psychol. 12, 689184.

Henrich, J.P., Henrich, J.P., 2007. Why Humans Cooperate: A Cultural and Evolutionary Explanation. Oxford University Press, New York.

Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., Tracer, D., 2005. "Economic man" in cross-cultural perspective: behavioral experiments in 15 small-scale societies. Behav. Brain Sci. 28 (6), 795–855.

Hentschel, T., Heilman, M.E., Peus, C.V., 2019. The multiple dimensions of gender stereotypes: a current look at men's and women's characterizations of others and themselves. Front. Psychol. 10, 11.

Hilbig, B.E., Glöckner, A., Zettler, I., 2014. Personality and prosocial behavior: linking basic traits and social value orientations. J. Pers. Soc. Psychol. 107 (3), 529–539.

Hsiang, S.M., Burke, M., Miguel, E., 2013. Quantifying the influence of climate on human conflict. Science 341 (6151).

Imhoff, R., Lamberty, P., 2020. A bioweapon or a hoax? The link between distinct conspiracy beliefs about the Coronavirus disease (COVID-19) outbreak and pandemic behavior. Soc. Psychol. Person. Sci. 11 (8), 1110–1118.

Isaac, R.M., Walker, J.M., Williams, A.W., 1994. Group size and the voluntary provision of public goods: experimental evidence utilizing large groups. J. Publ. Econ. 54 (1), 1–36.

Kappes, A., Nussberger, A.M., Faber, N.S., Kahane, G., Savulescu, J., Crockett, M.J., 2018. Uncertainty about the impact of social decisions increases prosocial behaviour. Nat. Hum. Behav. 2 (8), 573–580.

Karasawa, K., 1991. The effects of onset and offset responsibility on affects and helping judgments. J. Appl. Soc. Psychol. 21 (6), 482–499.

Kaschel, H., 2020, March 13. Coronavirus: How Germany Is Showing Solidarity amid the Outbreak. Deutsche Welle. https://p.dw.com/p/3ZO7b.

Kloss, J.D., Lisman, S.A., 2003. Clinician attributions and disease model perspectives of mentally ill, chemically addicted patients: a preliminary investigation. Subst. Use Misuse 38 (14), 2097–2107.
Kogut, T., Ritov, I., Rubaltelli, E., Liberman, N., 2018. How far is the suffering? The role of psychological distance and victims' identifiability in donation decisions. Judgm. Decis. Mak. 13 (5), 458.
Krull, J.L., MacKinnon, D.P., 2001. Multilevel modeling of individual and group level mediated effects. Multivariate Behav. Res. 36 (2), 249–277.
Kuhlman, D.M., Camac, C.R., Cunha, D.A., 1986. Individual differences in social orientation. In: Wilke, H., Messick, D., Rutte, C. (Eds.), Experimental Social Dilemmas. Verlag Peter Lang, New York, NY, pp. 151–176.
Lange, J., Crusius, J., 2015. Dispositional envy revisited: unraveling the motivational dynamics of benign and malicious envy. Pers. Soc. Psychol. Bull. 41 (2), 284–294.
Lee, K., Ashton, M.C., 2018. Psychometric properties of the HEXACO-100. Assessment 25 (5), 543–556.
Malti, T., Gummerum, M., Ongley, S., Chaparro, M., Nola, M., Bae, N.Y., 2016. "Who is worthy of my generosity?" Recipient characteristics and the development of children's sharing. Int. J. Behav. Dev. 40 (1), 31–40.
McClintock, C.G., Allison, S.T., 1989. Social value orientation and helping behavior. J. Appl. Soc. Psychol. 19 (4), 353–362.
Murphy, R.O., Ackermann, K.A., Handgraaf, M., 2011. Measuring social value orientation. Judgm. Decis. Mak. 6 (8), 771–781.
Okun, M.A., Yeung, E.W., Brown, S., 2013. Volunteering by older adults and risk of mortality: a meta-analysis. Psychol. Aging 28 (2), 564.
Ostrom, E., Burger, J., Field, C.B., 1999. Revisiting the commons: local lessons, global challenges. Science 284 (5412), 278–282.
Páez, D., Basabe, N., Ubillos, S., González-Castro, J.L., 2007. Social sharing, participation in demonstrations, emotional climate, and coping with collective violence after the March 11th Madrid bombings. J. Soc. Issues 63 (2), 323–337.
Paulus, M., 2020. Is young children's helping affected by helpees' need? Preschoolers, but not infants selectively help needy others. Psychol. Res. 84 (5), 1440–1450.
Peters, A., 2009. Pathways Out of the Crisis: CSR as a Strategic Tool for the Future, 5. Bertelsmann Stiftung. https://www.bertelsmann-stiftung.de/fileadmin/files/BSt/Publikationen/GrauePublikationen/GP_Pathways_out_of_the_crisis.pdf. (Accessed 12 March 2021).
Petersen, M.B., Slothuus, R., Stubager, R., Togeby, L., 2011. Deservingness versus values in public opinion on welfare: the automaticity of the deservingness heuristic. Eur. J. Polit. Res. 50 (1), 24–52.
Piston, S.C., 2014. Sympathy for the Poor, Resentment of the Rich, and Their Political Consequences (Doctoral Dissertation). https://deepblue.lib.umich.edu/bitstream/handle/2027.42/109000/spiston_1.pdf. (Accessed 12 March 2021).
Ramkissoon, H., 2020. COVID-19 Place confinement, pro-social, pro-environmental behaviors, and residents' wellbeing: a new conceptual framework. Front. Psychol. 11, 2248.
Raposa, E.B., Laws, H.B., Ansell, E.B., 2016. Prosocial behavior mitigates the negative effects of stress in everyday life. Clin. Psychol. Sci. 4 (4), 691–698.
Rendtorff, J.D., 2014. The importance of responsibility in times of crisis. Nordicum-Mediterraneum 9 (3). http://nome.unak.is/nm-marzo-2012/vol-9-no-3-2014/73-conference-paper/491-the-importance-of-responsibilityin-times-of-crisis. (Accessed 12 March 2021).
Robert Koch-Institut, 2020. Informationen und Hilfestellungen für Personen mit einem höheren Risiko für einen schweren COVID-19-Krankheitsverlauf. https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Risikogruppen.html. (Accessed 12 March 2021).
Roberts, B.W., Walton, K.E., Viechtbauer, W., 2006. Patterns of mean-level change in personality traits across the life course: a meta-analysis of longitudinal studies. Psychol. Bull. 132 (1), 1–25.
Rodriguez, H., Trainor, J., Quarantelli, E.L., 2006. Rising to the challenges of a catastrophe: the emergent and prosocial behavior following Hurricane Katrina. Ann. Am. Acad. Polit. Soc. Sci. 604 (1), 82–101.
Rudolph, U., Roesch, S., Greitemeyer, T., Weiner, B., 2004. A meta-analytic review of help giving and aggression from an attributional perspective: contributions to a general theory of motivation. Cognit. Emot. 18 (6), 815–848.
Rutter, J., 2020. Coronavirus: Governing in a Time of Crisis. https://www.kcl.ac.uk/news/coronavirus-governing-in-a-time-of-crisis. (Accessed 12 March 2021).
Schneider, I.K., Dorrough, A.R., Frank, C., 2021. Ambivalence and adherence to recommendations to reduce the spread of COVID-19. PsyArXiv.
Schwartz, S.H., Clausen, G.T., 1970. Responsibility, norms, and helping in an emergency. J. Pers. Soc. Psychol. 16 (2), 299–310.
Schwartz, S.H., 1973. Normative explanations of helping behavior: a critique, proposal, and empirical test. J. Exp. Soc. Psychol. 9, 349–364.
Shachat, J., Walker, M.J., Wei, L., 2020. The Impact of the Covid-19 Pandemic on Economic Behaviours and Preferences: Experimental Evidence from Wuhan. ESI Working Paper 20-33. https://digitalcommons.chapman.edu/esi_working_papers/328/. (Accessed 12 March 2021).
Toplak, M.E., West, R.F., Stanovich, K.E., 2011. The Cognitive Reflection Test as a predictor of performance on heuristics-and-biases tasks. Mem. Cognit. 39 (7), 1275–1289.
Tscharaktschiew, N., Rudolph, U., 2016. The who and whom of help giving: an attributional model integrating the help giver and the help recipient. Eur. J. Soc. Psychol. 46 (1), 90–109.
United Nations, 2020. Shared Responsibility, Global Solidarity: Responding to the Socio-Economic Impacts of COVID-19. The United Nations Sustainable Development Group. https://unsdg.un.org/sites/default/files/2020-03/SG-Report-Socio-Economic-Impact-of-Covid19.pdf. (Accessed 12 March 2021).
Valente, T.W., Pumpuang, P., 2007. Identifying opinion leaders to promote behavior change. Health Educ. Behav. 34 (6), 881–896.
Van Lange, P.A., Bekkers, R., Schuyt, T.N., Vugt, M.V., 2007. From games to giving: social value orientation predicts donations to noble causes. Basic Appl. Soc. Psychol. 29 (4), 375–384.
Varma, M.M., Chen, D., Lin, X.L., Aknin, L.B., Hu, X., 2020. Prosocial behavior promotes positive emotion during the COVID-19 pandemic. PsyArXiv.
Vazire, S., 2016. Editorial. Soc. Psychol. Person. Sci. 7 (1), 3–7.
Wang, Y., Ge, J., Zhang, H., Wang, H., Xie, X., 2020. Altruistic behaviors relieve physical pain. Proc. Natl. Acad. Sci. Unit. States Am. 117 (2), 950–958.
Weiner, B., Osborne, D., Rudolph, U., 2011. An attributional analysis of reactions to poverty: the political ideology of the giver and the perceived morality of the receiver. Pers. Soc. Psychol. Rev. 15 (2), 199–213.
Word Health Organization, 2020. Coronavirus Disease (COVID-19) Pandemic. https://www.who.int/emergencies/diseases/novel-coronavirus-2019. (Accessed 12 March 2021).
Yang, C., Wang, Y., Wang, Y., Zhang, X., Liu, Y., Chen, H., 2020. The effect of sense of community responsibility on residents' prosocial behavior: evidence from the dictator game. Int. J. Environ. Res. Publ. Health 17 (2), 460.
Zell, E., Strickhouser, J.E., Sedikides, C., Alicke, M.D., 2020. The better-than-average effect in comparative self-evaluation: a comprehensive review and meta-analysis. Psychol. Bull. 146 (2), 118–149.
Zuckerman, M., Siegelbaum, H., Williams, R., 1977. Predicting helping behavior: willingness and ascription of responsibility. J. Appl. Soc. Psychol. 7 (4), 295–299.