

A META-ANALYSIS OF THE DICTATOR GAME: HOW HAS INDIVIDUAL  
GENEROSITY BEEN IMPACTED BY THE COVID-19 PANDEMIC?

A RESEARCH PROJECT

SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

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MASTER OF SCIENCE

BY

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## **Acknowledgements**

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## **Introduction**

On March 11, 2020, the World Health Organization (WHO) declared a novel coronavirus (COVID-19) outbreak to be a global pandemic (Cucinotta & Vanelli, 2020). The full impact of this pandemic—psychological, economic, or otherwise is currently of great interest to researchers across fields. Of particular interest to the present study is the potential impact of COVID-19 on peoples' prosociality and subsequent charitable donation behaviors. Theory on altruism, prosociality, and phenomena unique to pandemics inform the present study. Understanding how people's selflessness, and in turn, their donating behaviors, have been affected by such an influential event as COVID-19 is a quickly developing topic, with research across disciplines, with varying research design. Because of the global scale of the COVID-19 pandemic, the opportunity for culturally diverse research is there.

The emerging nature of this topic makes it ideal for systematic review, which could establish a broader view of the influence of COVID-19 by comparing results from studies using similar methodology. The present study aimed to do just this, using meta-analysis to quantitatively compare the findings from studies which used the classic dictator game to measure prosociality. As noted, this topic spans many fields of study. Additionally, the dictator game is a versatile method that spans many fields of study. As such, the sample of studies found in the present study employed a vast array on experimental manipulations. The findings from the present study should serve as easy inspiration for those seeking to expand on this area of research.

## **Altruism**

At the foundation of this entire study is altruism. In the social sciences, altruism is viewed as the motivation to improve someone else's welfare (Fehr, 2003). It can also be thought of as the opposite of selfishness. Pure altruism is often thought of as one of the primary motivators for donating money.

Also, consider that altruism can be a state of mind or a personality trait (Peng et al., 2021). A method like the dictator game, discussed in more detail below, would be used to measure an altruistic state of being. Someone with an altruistic personality would be more likely to engage in prosocial behavior.

Think of prosocial behavior as the outcome from having an altruistic perspective. The way a person wants to improve others' lives will depend on a multitude of factors. One person might donate money, while another volunteers their time at a fundraising event. Altruism is the *why*, and prosocial behavior is the *what*.

## **Charitable Giving**

Altruism and prosocial behavior were established first because this is the lens through which we are going to be looking at charitable giving. Much research has gone into other motivators for charitable giving (e.g. tax incentives as a primary motivator for corporate giving; Navarro, 1988), but for the purpose of the present study, we will focus on individual giving through an altruistically-motivated lens.

## ***Impure Altruism and Charitable Giving***

Monetary donations are one such example of prosocial behavior in action. Unlike other forms of prosocial behavior, charitable giving is more associated with impure altruism. Impure altruism is an idea from economics theory that refers to a phenomenon that occurs within charitable giving spaces wherein the monetary exchange is not the sole motivator for transaction. Instead, social and group loyalties also have an influence upon the consumer's decision (Andreoni, 1989).

### ***Operational definition***

Research into charitable giving is vast and the theoretical framework outlined here needed to be focused by clearly defining what area of charitable giving is under scrutiny in the present study. The present study defines charitable giving as: voluntary, monetary contributions made by an individual with the intent of helping someone other than themselves. Studies that focused on other forms of prosocial behavior, such as corporate philanthropy (as opposed to individual giving) or individual volunteering habits, for example, were excluded. A full list of exclusion criteria can be found in methods, below. To stay within the scope of the present study, assume "charitable giving", "charitable donations", and other variations of the phrasing to indicate the same concept, unless specifically noted elsewhere. Note that within the experimental settings of the studies included for meta-analysis, hypothetical transactions were permitted.

**Altruism as a driver of charitable giving.** Bekkers and Wiepking (2011) give thorough survey of the drivers of charitable giving, highlighting altruism as one of the key players. Although it is conceptually linked, many other contributing factors (income level, awareness of need, efficacy of donation, etc.) make pure altruism difficult to prove as a sole motivator.

**Other Drivers of Charitable Giving.** Salience of need, or how obvious the need of a given person is, only slightly affects the likelihood to donate. “The result of these moderating factors is that the overall effect of need on giving is small, (Bekker, 2011)”. Bekkers (2011) also reported efficacy of donation as an influential factor: “when people perceive that their contribution will not make a difference, they are less likely to give”. Clearly, there are many contributing factors to the act of donation.

### **Psychological Implications of Pandemics**

Halevy (2020) investigated strategic thinking and decision-making with the context of the COVID-19 pandemic, finding that people more aware of the impact of their actions are more likely to comply with social distancing guidelines and donate money to charitable organizations.

Butovskaya et al (2021) explored empathy as an aspect of resilience during a crisis such as the COVID-19 pandemic. Their cross-cultural approach was appropriate considering the global impact of the pandemic—showing how social events in one cultural might be a boon whereas across the world, they might be detrimental.

### ***Charitable Giving During Times of Crisis***

Catastrophe compassion is a phenomenon found shortly after traumatic events, such as terrorist attacks, natural disasters, or in this case pandemics, in which people ‘band together’. Zaki (2020) perfectly explains one possible reason for the occurrence, “When disasters strike, victims may suddenly be linked in the most important de novo group to which they have ever belonged.”. Within the context of the COVID-19 pandemic, examples of catastrophe compassion can be seen in places where social distancing guidelines were strictly upheld, as well as by looking online at the many fundraising initiatives that have met their goal.

Looking at donations during COVID-19 in the United States, the human services industry leads with most dollars received at 1.9 billion, with the health industry following with 1.7 billion dollars received (Foundation Center & GuideStar). The world is still in the process of dealing with this pandemic, so further research into recent trends is still developing.

## **Present Study**

The present study used meta-analysis to systematically investigate the impact of COVID-19 on prosocial behavior. As outlined earlier, prosocial behavior can be measured in many ways, so to home in on a reasonable sample of studies, the current study chose to focus on prosocial behavior as expected in the classic economics experiment, the “dictator game”.

## ***Dictator Game***

Many methods are used to investigate altruism (SRA scale, Rushton et al., 1981; Big Five models of personality, Ashton et al., 1998) and more specifically charitable giving and so, to define a realistic sample of studies that could be reviewed by one researcher, the dictator game was selected as a measure of prosocial behavior to focus on in the present study. Filkowski, Cochran, and Haas (2016) give a thorough theoretical review of these commonly used altruism methods, breaking them into self-report behavioral measures.

The classic dictator game is a behavioral measure firmly established as a reliable measure of altruism and prosociality.

The dictator game is a simple and easy to implement method used in many fields for many purposes. One such example is Charness and Gneezy (2000) who investigated social distance between giver and receiver within dictator and ultimatum games, finding that recipients who ‘knew’ their donors received a much larger gift than did those who did not know their partner.

Hellman et al. (2021), using the dictator game to measure prosociality, found allocations in-game increased with the giver's responsibility and the recipient's vulnerability to the [COVID-19] virus".

Within another field, anthropology, the dictator game finds another use. "Anthropologists have frequently used the dictator game as a technology for quantifying the sociability of developing or indigenous cultures (Engel, 2011)."

In communications studies, Banker and Park (2020) evaluate social media messaging, using the dictator game method to measure effectiveness.

**Before the Dictator Game.** Guth et al. (1982) first attempted the novel "ultimatum game" to better understand the economic idea of *homo economicus*, a now outdated view of the "rational maximizer of self-interest" (Yamagishi et al., 2014). This game has participants bargaining with one another, and humans are "systematically more benevolent than *homo economicus*" (Engel, 2011). After initial findings suggested that other factors may be affecting participant behavior based on the research design, Brandstatter and Guth (2002) adapted the method into the dictator game known today.

**Previous Meta-Analyses on the Dictator Game.** This method lends itself to a systematic review due to the variation in game structure found across fields. A meta-analysis allowed for the investigation of the overall performance of the dictator game across many studies with different parameters.

Engel (2011) conducted a robust review and identified a few key points of difference in procedure across a sample of 80 dictator games: incentive, social control (anonymity of dictator), distributive concerns ("how deserving is the recipient?"), framing, social distance and

demographics were all investigated after initial analysis of individual study findings using meta-regression analysis.

### ***Why now? (Why investigate COVID-19?)***

As the world heals from the initial impact of COVID-19, the need to understand the intricacies of its influence will only become pronounced. In the U.S. alone, the non-profit sector lost approximately 930,000 jobs since the beginning of the pandemic (Center for Disaster Philanthropy, 2021).

A significant change to altruistic behavior could stay with a person. When Bandy and Wilhelm (2007) investigated family structure and income's effects on a child's prosocial behavior later, they proposed a model of prosocial behavior wherein altruistic attitudes snowball overtime in a person. This could mean people whose altruistic beliefs have been greatly affected by COVID-19 could carry those changed attitudes with them into the future, providing another motivator to better understanding the extent of the current pandemic.

The pandemic has also motivated many researchers to approach this topic from many different angles. Simply put by Engel (2011), "the dictator game has become popular among experimentalists", making it a good point of further study with a meta-analysis. With the many applications of the dictator game, come many (often conflicting) results.

The present study aims determine an answer to the question "How has charitable donation behavior changed in people during COVID-19?" by calculating an overall generosity measure from studies using the dictator game with data collected during the COVID-19 pandemic and comparing to established benchmarks (found in previous dictator game meta-analyses). Patterns in related factors (such as age, social distance, and other manipulations) found

within the sample of studies included for meta-analysis will be reported. A non-directional approach was selected given the highly situational nature of human prosociality.

## **Method**

To provide an overview of the following content, the meta-analysis was broken into four distinct phases: 1) research question definition, 2) literature search & selection, 3) data abstraction & analysis, and 4) data visualization & interpretation. This process was based on meta-analysis guidelines and recommendations from Higgins et al (2019), who created the *Cochrane handbook*, an invaluable resource for novices to meta-analysis as well as Chen and Peace (2013) who provided several applied examples.

### **Research Question Definition**

I wanted to better understand the motivations behind charitable donations. Using the PICO method to refine my vague ponderings into a concrete research question, I decided to focus on a global population of people who have been affected by the COVID-19 pandemic.

Beginning search strategy was informed by Pannabecker (2016) who developed a literature review plan and search log strategy. Full documentation for the search process can be found in the appendix below. This strategy gave me a systematic way to look through many databases. After a preliminary literature review to familiarize myself with recent findings, I conducted an official search process.

To reiterate, the research question of the present study is, “How has charitable donation behavior changed in people during COVID-19?”? Because of the many contributing factors to charitable giving, I did not feel it was appropriate to specify directionality.

## Literature Search & Selection

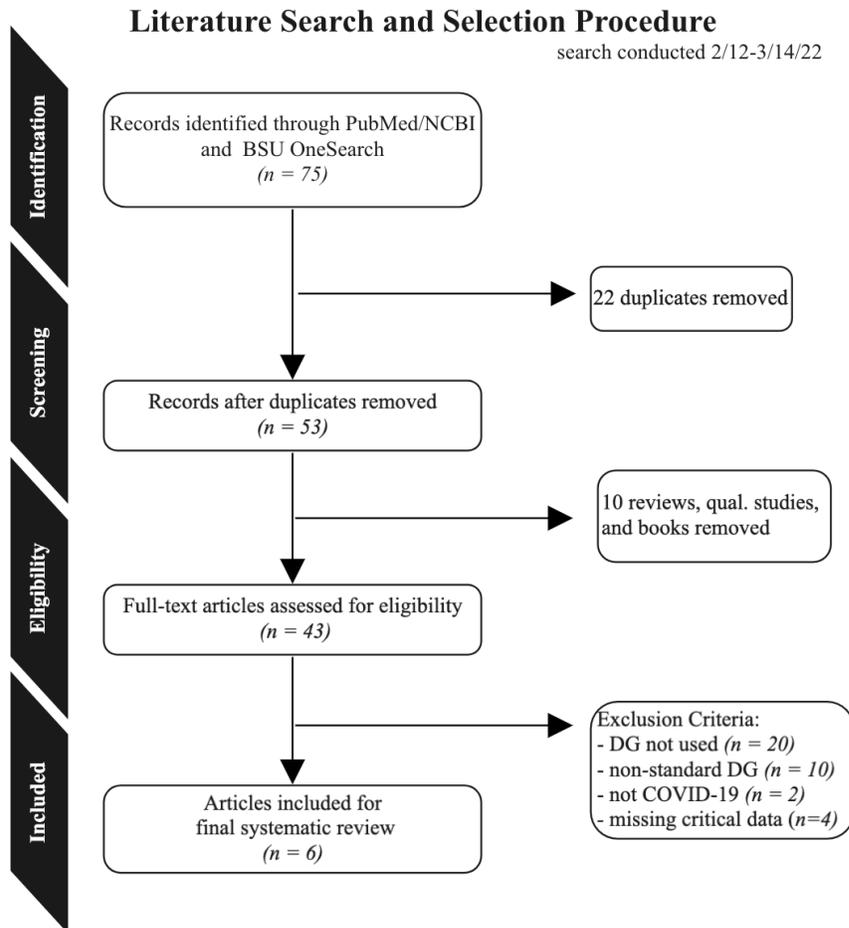


Figure 1 shows the procedure used to select articles for the proposed meta-analysis.

Details of each phase are discussed below.

### **Identification**

The search for relevant literature began with BSU OneSearch. PubMed was another significant source of recent peer-reviewed research. Google Scholar was used to find full-text versions for a few hard-to-find articles.

### ***Screening***

A connection to COVID-19 was one of the baseline requirements for a study to be considered, given the aim of the present study was to understand generosity specifically within the context of the pandemic. This was achieved in two ways; “COVID-19” was one of the top keywords used in search terms and publication dates were limited to a range of 3/11/20-3/14/22 across all database searches. Note that in the next phase, eligibility, data collection dates were reviewed to ensure that it occurred during the period in which the WHO declared COVID-19 a global pandemic (Cucinotta & Vanelli, 2020).

Because of the varied application of the dictator game, the keyword, “altruism” was identified as an important addition to the search term. Its inclusion helped to filter out the majority of economics and marketing experiments that were completely outside of the scope of the present study.

### ***Eligibility***

As a baseline requirement, studies had to employ a ‘standard dictator game’. In their recent meta-analysis on the dictator game and ultimatum game, Tisserand, Cochard, and Le Gallo (2015) defined a standard dictator game as:

“...the dictator game under its original form initially proposed by Forsythe et al. (1994) with 2 anonymous players and a random entitlement. Each experience offers a minimum

of 8 separate decisions to dictators: it excludes the dictator games where individual sets of strategies are too small and force players to opt for extreme choices.”

The present study took a slight modification to the standard game and included both studies which utilized a manipulated ‘target’ or ‘recipient’ (e.g., a specific charity or person), or the traditional set-up; an anonymous second player. Hypothetical transactions (as opposed to only real-money transactions) were also allowed to be included since there was a limited number of studies available.

Exclusion criteria became more obvious as the review process continued. Modifications to the dictator game were common; many studies were cut because they did not adhere to the standard dictator game ( $n = 10$ ). As data analysis began, a few additional studies were removed because they lacked any standard error data, a necessary component to be included in a meta-analysis.

### ***Included***

A total of 6 articles were included after the final review. These studies reported the necessary statistics (average offer made and standard deviation).

### **Data Analysis**

Once articles were selected and reviewed, I was able to extract the data that would power the rest of this project. The full data abstraction process is detailed below. From this process, Table 1 was created, in which you can see the sample size, average offer made, standard deviation and other descriptive data for each study included in the meta-analysis. Average offer made was standardized in percentage given to account for the varying sizes of initial endowment across studies. Standard error was calculated using standard deviation and sample size.

### ***Data Abstraction Process***

Experimental research takes much coordination, funding, and time so single method studies are rare. As such, keep in mind that data reported in Table 1 is representative of only the dictator game portion of each study. For example, Schindler and Pfattheicher (2021) employed a total sample size of 1240 but only 525 of those participants were a part of the dictator game method included in this meta-analysis.

Due to some incomplete reporting, there were instance where I had to estimate exact values when some information was only presented via visualization. These cases are marked in

Table 1:

Identifiers			Effect Size	Variance	Sampling	
Author	Year	ID	Average % Given	Standard Deviation	Total Sample Size	Sampling Method
de Melo	2021	1	40.74	5.5*	184	MTurk
Shachat	2021	2	33.00	1.08	602	Random students
Yin	2021	3	38.42	28.29	289	Random convenience
Schindler	2021	4	28.1	15.46	525	MTurk
Guo	2021	5	27.4	1.01	39	Random students
Brañas-Garza	2021	6	48	2*	177	Convenience student

*Table 1 contains overview descriptives and other data collected during abstraction from the studies included. An asterisk\* indicates that a value had to be estimated from a graph because an exact value was not reported.*

### ***Estimation Method***

Meta-analyses can be used with either fixed or random effects assumed. Given the vast differences in focus, sampling, and research design found within this sample of studies, it was

best to move forward with a random effects model, which is designed to accommodate a sample with varying residual errors (Engel, 2011). This model follows the equation below:

$$y = \mathbf{x}'_i\beta + u + e_i$$

This model is best for the present study because homogeneity between studies shouldn't be assumed with this sample.

## Results

### Overall Generosity

Referring to Engel's pre-COVID-19 meta-analysis (2011), the typically giving amount in the classic dictator game sits at 30% of the initial endowment. Based on data from dictator games conducted during peak COVID-19 months, the average baseline giving amount was 35.94%, a slight increase of just over 5%. Note that this average does not account for sample size and standard error differences (as the meta-analysis model does).

A random-effects meta-analysis of means model found an overall mean of 33.8% given in the dictator game across six studies. Confidence intervals can be found in figure 2, below. A test for heterogeneity between studies was conducted, and it was non-significant ( $Q(5) = 1.12, p = 0.95$ ). It is important to highlight, however, that Cochran's Q, the test used to check for heterogeneity, has lower power when evaluating a small sample size of studies, such as in the present study (Gavaghan et al., 2000). This is one possible explanation for the non-significant result. Another possibility is that the studies were all truly evaluating the same effect—though based on the many research design differences across each study, this seems unlikely. Given the nature of this test and what we know about our sample data, this test would likely be significant with a larger sample and the same level of variation.

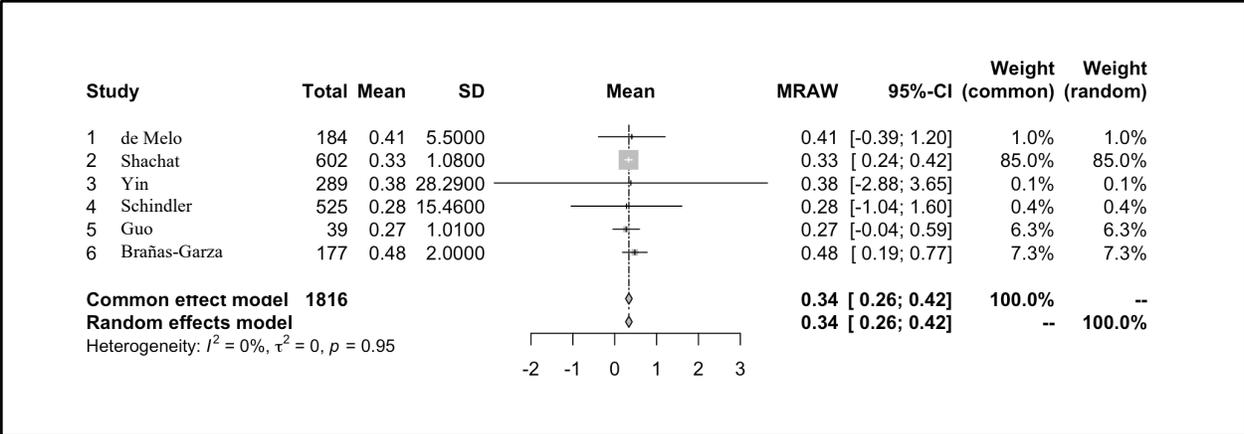


Figure 2 is a forest plot showing the overall mean and test for heterogeneity found from the meta-analysis model.

The forest plot (figure 2) also highlights an imbalance in weight distribution; Study 2 received 85% weight. This is not surprising, considering its relatively large sample size and low standard deviation, the two components that go into weight scoring, but generally speaking, it is not ideal when a meta-analysis is so swayed by one study. Study 3’s large SD (28.29) explains the very small weight distribution it was given (0.1%).

### Conclusion and Discussion

The dictator game should be considered an inspiring method to research in terms of possibilities for experimental manipulations—which explains its recent popularity across many fields of study (economics, psychology, communications). As demonstrated by the sample of studies reviewed by the present study, application of the dictator game is diverse and creative. The current study found that generosity has slightly increased during the COVID-19 pandemic. As highlighted throughout the literature, there are so many contributing factors to an individual’s expressed prosociality that an increase of even 3.8% in an established measure such as the dictator game simply because of the pandemic is still notable.

### Limitations of the Present Study

A primary concern is the conceptual fit of dictator game to measure charitable donations—a concern best highlighted by one of the procedural factors introduced by Engel (2011), “In the standard dictator game, the dictator received money from the experimenter and is free to give a fraction to the recipient.”. While this might be a measure of basic altruism, who’s to say it’s an aspect of altruism correlated with actual monetary contributions to social good organizations? It is a bare-bones laboratory experiment devoid of the nuance found in real life philanthropy. Krupka and Weber (2013) address a similar concern in their review of the dictator game method, stating, “The relationship between social norms, as elicited with our method, and behavior may be more complex in other games”, acknowledging the potential oversimplification that the dictator game can invertedly create.

Another huge area of related literature to this topic exists in the investigation of the incentivizing nature of tax breaks for monetary donations. Many economists explore this topic when trying to look at charitable giving in the context of real life. For the present study, this perspective was not considered as much as might have been warranted. For further reading on this topic, consider Navarro’s 1988 investigation.

Because research included in the present study was restricted to the COVID-19 pandemic in terms of publishing date, most experiments were conducted online due to social distancing and health safety guidelines. Online research comes with its own limitations and strengths, and this concern could be magnified in dictator game research. The environment of an experiment affects the results found. One such example comes from Engel (2011)’s meta-analysis on the dictator game who describes, “dictators [who] handle coins or notes, they give substantially more...remarkably, they become much more likely to give everything.”. Just by handling ‘real’ money, as opposed to discussing it or clicking a button on a computer, established behavior is

disrupted. Considering the growing prevalence of online donations (42% increase in the last three years, Blackbaud Institute, 2021), perhaps online experimentation offers a more accurate setting.

To conclude, the present meta-analysis found a slight increase in baseline generosity from an extremely small sample of dictator games conducted during the COVID-19 pandemic. Given time for more researchers to analyze and publish their pandemic work, there could be the possibility to revisit this topic to achieve a more complete review. The answer to our research question, “How has generosity in people been affected by the pandemic” is “it depends”. The explanatory factors that go into charitable giving are numerous. Because COVID-19 is a public health crisis, it has boosted altruism and charitable giving in many people.

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## Appendix

### Developing your comprehensive search strategy

#### Topic:

Charitable Giving During COVID-19: Changes and Perseverance in Prosocial Behavior

#### General questions:

How has the novel COVID-19 pandemic affected the psychological wellbeing of people across the globe?

Has a public health crisis of this scale increased the salience of need? And if so, has this positively or negatively affected the rate at which people engage in prosocial behavior?

How do compounding factors such as culture/religion, government response, personal exposure to COVID-19, and other drivers of charitable giving interact in this particular historical event?

Are the changes observed long lasting?

#### Research questions:

Across the globe, how has prosocial behavior in adults been affected by the COVID-19 pandemic?

How do the different drivers of prosocial behavior interact within this COVID-19 context?

#### Outcomes / Categories of information desired:

*Themes and gaps in current knowledge as well as building upon theory built before the novel COVID-19 pandemic.*

## **Inclusion / Exclusion Criteria for your review**

*Ex: Empirical studies or reviews that specifically address/discuss/provide results related to one or more of our outcomes of interest; all dates; must address location/population within southeastern United States; not interested in commentary, editorials, or case studies for this review*

*Empirical studies and systematic reviews that investigate altruism in adults using some variation of the classic dictator game; published after March 2020 (at which point COVID-19 was officially pronounced a pandemic); should address any population of people impacted by COVID-19 (defined as any country or region that declared a state of emergency due to the COVID-19 virus); not interested in the ultimatum game measure of altruism or in studies done on adolescents or younger; variations in dictator game are acceptable so long as the base structure remains unchanged*

## **Information Sources:**

### Databases:

*PubMed*

*Ball State OneSearch*

*JSTOR*

*NCBI*

*\*Not sure where to start? Check library Subject Guides for recommendations: <http://guides.lib.vt.edu/>*

### Grey Literature:

**Web Search Engines:** Google Scholar, Arxiv (pre-publication due to the emerging nature of the pandemic's effects)

### **Specific Websites or other sources:**

*Publication on Philanthropy Trends: <https://candid.org/explore-issues/coronavirus>*

*Social Science Research Network (SSRN):*

[https://papers.ssrn.com/sol3/JELJOUR\\_Results.cfm?form\\_name=journalBrowse&journal\\_id=3468864&Network=yes&lim=false](https://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalBrowse&journal_id=3468864&Network=yes&lim=false)

## **Search Strategy:**

Altruism:

Keywords, synonyms: prosocial behavior, dictator game, impure altruism

Saliency of Need:

Keywords, synonyms: Impacted by COVID-19, drivers of philanthropy, perceived risk

Volunteering:

Keywords, synonyms: non-monetary prosocial behavior

### **Search Strategy Builder Tool**

## **Search Record:**

### **SEARCH 1**

Database / Search Engine / Top-Level Source: PubMed

Platform / Publisher: National Center for Biotechnology Information (NCBI) / National Library of Medicine (NLM)

Date Range of Coverage from source: March 2020 – February 2022

Date Searched: 02-12-22

Search typed in: altruism AND dictator game AND COVID-19

Limits / Refinements / Filters / Options used?: Full Text Online

Number of Results: 2

Alert set?: No

Quality of Results - how is this search for your topic?: Good

Notes: one article is relevant for lit review, another article has potential for inclusion in meta analysis

*Citations:*

de Melo CM, Gratch J, Krueger F. Heuristic thinking and altruism toward machines in people impacted by COVID-19. *iScience*. 2021 Mar 19;24(3):102228. doi: 10.1016/j.isci.2021.102228. Epub 2021 Feb 23. PMID: 33644708; PMCID: PMC7901281.

Romero-Rivas C, Rodriguez-Cuadrado S. The Psychological Impact of the COVID-19 Pandemic Affected Decision-Making Processes. *Span J Psychol*. 2021 Mar 22;24:e16. doi: 10.1017/SJP.2021.14. PMID: 33745483.

**SEARCH 2**

Database / Search Engine / Top-Level Source: PsychInfo

Platform / Publisher: APA

Date Range of Coverage from source: March 2020 – February 2022

Date Searched: 02-14-2022

Search typed in: altruism AND dictator game AND COVID-19

Limits / Refinements / Filters / Options used?: Full Text Online, English

Number of Results: 1

Alert set?: No

Quality of Results - how is this search for your topic?: Ok

Notes: this article is a mixed methods approach—dictator game is involved, but (if memory serves) highly altered.

*Citations:*

van de Groep, S., Zanolie, K., Green, K. H., Sweijen, S. W., & Crone, E. A. (2020). A daily diary study on adolescents' mood, empathy, and prosocial behavior during the COVID-19 pandemic. *PLoS ONE*, 15(10). <https://doi.org/10.1371/journal.pone.0240349>

### **SEARCH 3**

Database / Search Engine / Top-Level Source: JSTOR

Platform / Publisher: Access provided by Ball State Libraries

Date Range of Coverage from source: March 2020 – February 2022

Date Searched: 02-14-2022

Search typed in: altruism AND dictator game AND COVID-19

Limits / Refinements / Filters / Options used?: Full Text Online, English

Number of Results: 0

Alert set?: No

Quality of Results - how is this search for your topic?: N/A

Notes: No usable articles

*Citations: N/A*

### **SEARCH 4**

Database / Search Engine / Top-Level Source: BSU OneSearch

Platform / Publisher: Access provided by Ball State Libraries

Date Range of Coverage from source: March 2020 – February 2022

Date Searched: 02-14-2022

Search typed in: altruism AND dictator game AND COVID-19

Limits / Refinements / Filters / Options used?: Full Text Online, English, Published Journal Article

Number of Results: 32

Alert set?: No

Quality of Results - how is this search for your topic?: High quality; diverse in geography and subject matter—will need further sorting to identify articles fit for meta-analysis (TBD with data extraction forms)

Notes: a few of the 32 results were duplicate (e.g. van de Groep had three entries, D. Peleg twice, etc)

*Citations:*

de Melo, C. M., Gratch, J., & Krueger, F. (2021). Heuristic thinking and altruism toward machines in people impacted by COVID-19. *Iscience*, 24(3), 102228-102228.

<https://doi.org/10.1016/j.isci.2021.102228>

van de Groep, S., Zanolie, K., Green, K. H., Sweijen, S. W., & Crone, E. A. (2020). A daily diary study on adolescents' mood, empathy, and prosocial behavior during the COVID-19 pandemic. *PloS One*, 15(10), e0240349-e0240349. <https://doi.org/10.1371/journal.pone.0240349>

Romero-Rivas, C., & Rodriguez-Cuadrado, S. (2021). The psychological impact of the COVID-19 pandemic affected decision-making processes. *The Spanish Journal of Psychology*, 24, e16-e16.

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Branas-Garza, P., Jorrot, D., Kovarik, J., & Lopez, M. C. (2021). Hyper-altruistic behavior vanishes with high stakes. *PloS One*, 16(8), e0255668-e0255668. <https://doi.org/10.1371/journal.pone.0255668>

Miles, A., Andiappan, M., Upenieks, L., & Orfanidis, C. (2021). Using prosocial behavior to safeguard mental health and foster emotional well-being during the COVID-19 pandemic: A registered report protocol for a randomized trial. *PloS One*, 16(1), e0245865-e0245865.

<https://doi.org/10.1371/journal.pone.0245865>

Giovanis, E., & Ozdamar, O. (2020;2022;). Who is left behind? altruism of giving, happiness and mental health during the covid-19 period in the UK. *Applied Research in Quality of Life*, 17(1), 251-276.

<https://doi.org/10.1007/s11482-020-09900-8>

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Jordan, J. J., Yoeli, E., & Rand, D. G. (2021). Don't get it or don't spread it: Comparing self-interested versus prosocial motivations for COVID-19 prevention behaviors. *Scientific Reports*, 11(1), 20222-20222. <https://doi.org/10.1038/s41598-021-97617-5>

Asri, A., Asri, V., Renerte, B., Foellmi-Heusi, F., Leuppi, J. D., Muser, J., Nueesch, R., Schuler, D., & Fischbacher, U. (2021). Wearing a mask-for yourself or for others? behavioral correlates of mask wearing among COVID-19 frontline workers. *PloS One*, 16(7), e0253621-e0253621. <https://doi.org/10.1371/journal.pone.0253621>

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Yang, X., Meng, W., Chen, S., Gao, M., & Zhang, J. (2021). Are people altruistic when making socially responsible investments? evidence from a tDCS study. *Frontiers in Neuroscience*, 15, 704537-704537. <https://doi.org/10.3389/fnins.2021.704537>

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Bogliacino, F., Codagnone, C., Montealegre, F., Folkvord, F., Gomez, C., Charris, R., Liva, G., Lupianez-Villanueva, F., & Veltri, G. A. (2021). Negative shocks predict change in cognitive function and preferences: Assessing the negative affect and stress hypothesis. *Scientific Reports*, 11(1), 3546-3546. <https://doi.org/10.1038/s41598-021-83089-0>

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Sun, Q., Guo, H., Wang, J., Zhang, J., Jiang, C., & Liu, Y. (2021). Differences in cooperation between social dilemmas of gain and loss. *Judgment and Decision Making*, 16(6), 1507.

Halevy, N. (2020). Strategic thinking and behavior during a pandemic. *Judgment and Decision Making*, 15(5), 648-659.

Yin, L., Mao, R., & Ke, Z. (2021). Charity misconduct on public health issues impairs willingness to offer help. *International Journal of Environmental Research and Public Health*, 18(24), 13039.

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Schiller, B., Kleinert, T., Teige-Mocigemba, S., Klauer, K. C., & Heinrichs, M. (2020). Temporal dynamics of resting EEG networks are associated with prosociality. *Scientific Reports*, 10(1), 13066-13066.

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Trishala, M. (2021). Big five personality traits as determinants of pro-social behaviour. *Indian Journal of Positive Psychology*, 12(2), 200-203.

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## **SEARCH 5**

Database / Search Engine / Top-Level Source: Arxiv

Platform / Publisher: open-access archive of pre-published, not-yet-peer-reviewed studies

Date Range of Coverage from source: March 2020 – February 2022

Date Searched: 02-14-2022

Search typed in: altruism AND dictator game AND COVID-19

Limits / Refinements / Filters / Options used?: Full Text Online, English, Published Journal Article

Number of Results: 0

Alert set?: No

Quality of Results - how is this search for your topic?: N/A

Notes: this is an acceptable source to use—cite recent meta analyses that gave similar reasoning (COVID is novel and we need emerging findings NOW)

*Citations: N/A*

## **SEARCH 6**

Database / Search Engine / Top-Level Source: NCBI

Platform / Publisher: PubMed Central

Date Range of Coverage from source: March 2020 – February 2022

Date Searched: 03-14-2022

Search typed in: altruism AND dictator game AND COVID-19

Limits / Refinements / Filters / Options used?: Full Text Online, English, Published Journal Article

Number of Results: 42

Alert set?: No

Quality of Results - how is this search for your topic?: N/A

Notes:

*Citations: exported in separate document*

## Source

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