PSIHOLOGIJA, 2022, Vol. 55(4), 379–395
DOI: https://doi.org/10.2298/PSI211107009B

UDC 177.7:159.9.072

Selfish Genes or Selfish Memes: The Effect of Genetic Relatedness Versus Value Similarity on Altruism*

Aleksandar Baucal** & Aleksandra Lazić***

University of Belgrade, Faculty of Philosophy, Department of Psychology, Serbia

Two preregistered quasi-experiments disentangled the effects of selfish genes and selfish memes on participants' self-reported willingness to help in hypothetical everyday-favor and life-or-death situations. Memes were operationalized as the perceived level of similarity in important attitudes and values between the person participating in the study and a selected target person, assessed and reported by the participant. In Study 1 (N = 761), altruism was highest for siblings, and then for cousins and nonkin; greater memetic similarity was also associated with greater altruism; and the interaction between the factors was not significant. In Study 2 (N = 841), conducted during the COVID-19 pandemic, altruism was highest for siblings, but the same for cousins and nonkin; the effect of memetic similarity was replicated; and the interaction term remained insignificant. Both studies controlled for a range of demographic and social relationship characteristics, suggesting a potentially relevant role of future contact probability and emotional closeness. We propose that, similarly to gene selfishness, meme selfishness can also bring about altruism: individuals would rather make

Corresponding author: abaucal@f.bg.ac.rs

Ethics Statement. This project was approved by the Institutional Review Board of the Department of Psychology, Faculty of Philosophy, University of Belgrade, Serbia (Protocol Number #2019-58 [Study 1] and #2020-016 [Study 2]).

Data Availability. The data and code are available at the Open Science Framework (https://osf.io/5fgpk [Study 1] and https://osf.io/c4mkv [Study 2]).

Funding. This work was supported, in part, by the Ministry of Education, Science and Technological Development of the Republic of Serbia [179018].

Author Contributions. The authors are listed in alphabetical order and contributed equally to this paper. Conceptualization: AB and AL. Data Curation: AL. Formal Analysis: AB and AL. Funding Acquisition: AB and AL. Investigation: AB and AL. Methodology: AB and AL. Project Administration: AB and AL. Resources: AB and AL. Validation: AL. Visualization: AL. Writing - Original Draft Preparation: AL. Writing - Review & Editing: AB and AL.

* Please cite as: Baucal, A., & Lazić, A. (2022). Selfish Genes or Selfish Memes: The Effect of Genetic Relatedness Versus Value Similarity on Altruism. *Psihologija, 55*(4), 379–395. https://doi.org/10.2298/PSI211107009B

** https://orcid.org/0000-0002-7965-7659

*** https://orcid.org/0000-0002-0433-0483

a personal sacrifice to help memetically similar than dissimilar others because similar others have a higher chance of spreading the helper's memes.

Keywords: selfish genes, selfish memes, helping, kin altruism

Highlights:

- Selfish genes and selfish memes were tested simultaneously in two quasi-experimental studies.
- Intention to help was higher for siblings than cousins and acquaintances.
- Intention to help was highest for memetically similar others (in terms of key values).
- No evidence that the memetic similarity effect depended on genetic relatedness.

Whom would you be more willing to save from a burning building – a sibling who is very different from you or an acquaintance who is similar to you? Studies using self-reports on behavioral choices and intentions in hypothetical situations (e.g., Burnstein et al., 1994; Cialdini et al., 1997; Curry et al., 2012; Korchmaros & Kenny, 2006; Stewart-Williams, 2007, 2008; Xue, 2013) suggest that costly and non-reciprocated help is more likely to be provided to kin rather than nonkin. Similarly, people reported having received greater support from kin than from nonkin (Neyer & Lang, 2003) and were more likely to bear actual physical pain for more closely related kin (Madsen et al., 2007). These kinship patterns correlate with real-world helping behaviors, such as food sharing (e.g., Betzig & Turke, 1986; Nolin, 2010), raising of offspring (e.g., Flinn, 2011) or alliance formation (e.g., Marlowe, 2010). Previous findings further suggest the presence of the so-called kinship premium: even after controlling for emotional closeness, genetic relatedness makes a significant, unique contribution to kin altruism (e.g., Bressan et al., 2009; Curry et al., 2012; Pollet et al., 2013). Korchmaros and Kenny (2001, 2006), however, propose that genetic relatedness indirectly affects helping through emotional closeness (in their studies, it accounts for up to 41 percent of the association between genetic relatedness and willingness to help).

How does kin altruism evolve? Sometimes, one's direct fitness has to be sacrificed for indirect fitness (i.e., the sum of one individuals' effect on their own reproductive success has to be traded for that of their relatives). According to the inclusive fitness theory (Hamilton, 1964), individuals should behave towards others as if they valued others' production of offspring in proportion to how closely related they are. Specifically, Hamilton's (1964) rule states that altruism will be favored by selection when $rb > c$, where c is fitness cost to the helper, b is the fitness benefit to the recipient, and r is the

coefficient of genetic relatedness between the helper and the recipient. The relatedness coefficient is equivalent to the probability that two individuals share the so-called gene "for" altruism (Dawkins, 2016). It has the value of 0.5 or 1/2 for full siblings, so altruism towards siblings has a good chance of evolving; on the other hand, it has the value of 0.125 or 1/8 for first cousins, so altruism toward cousins is far less likely to evolve. In Dawkins' (2016) terms, the gene for altruism is a "selfish gene" trying to increase the number of replicas of itself in future generations. Such gene selfishness can translate itself into individual altruism: individuals rather help closer than distant relatives because closer relatives have a higher chance of propagating the gene for such helping in future generations.

In 1976, in his book The Selfish Gene, Dawkins first coined the term "meme" to introduce a new kind of replicator. Memes are units of cultural transmission that spread by one person imitating another (Dawkins, 2016). They are everything from tunes, ideas, and catch-phrases, to stories, technologies, and scientific theories (Blackmore, 2000; Dawkins, 2016). Akin to selfish genes, memes selfishly compete to get copied for their own sake and "infect" as many human minds as possible.

Extending the gene metaphor to memes, we ask: Are people more willing to help those who are memetically similar? The motivation for such behavior can be that, presumably, memetically similar individuals have a higher chance of copying and spreading the helper's memes. It would mean that people tend to contribute to strengthening a community of beliefs, that is, the culture they identify themselves with. Given the rising polarization of societies, this tendency is becoming more relevant (Castle, 2018; Koch, 2017). A few previous studies suggest that similarity in certain kinds of memes is related to more helping. For example, early studies showed that people were more willing to help a stranger who was more similar to them in personality, values (Krebs, 1975), and opinions (Sole et al., 1975). More recently, Bressan and colleagues (2009) showed that similarity in interests, personality, way of thinking, and lifestyle was positively correlated with unconditional altruism towards siblings (see also Tifferet et al., 2016). Furthermore, people are more likely to help when a stranger is a member of their ingroup rather than their outgroup, based on memberships such as national identity, political party, or sports fan (see Balliet et al., 2014, for a review). Compared to the relation between genetic relatedness and emotional closeness, the relation between memetic similarly and emotional closeness has been less explored. However, Bressan and colleagues (2009) showed that correlations of perceived physical and psychological similarity with unconditional altruism vanished when emotional closeness was controlled for.

In analogy with Hamilton's (1964) rule, we hypothesize that $mb > c$ is also true, where c is fitness cost to the helper, b is the fitness benefit to the

recipient, and *m* is the coefficient of memetic similarity between the helper and the recipient.

Therefore, we assume that both kinds of Dawkins' replicators operate as selfish units. We further assume that similarity in genes and similarity in memes can be associated: people tend to spend more time and have more experiences with those who are genetically more similar to them; this might, in turn, make them more similar to each other in terms of memes. Given this assumption, it is not enough to show that similarity in genes is a significant factor in altruism because that might be confounded with similarity in memes, and vice-versa. Thus, to disentangle the potential effects of similarity in genes and similarity in memes, a study needs to include both as factors in the design.

We tested the effects of genetic relatedness and memetic similarity between the helper and the recipient in a single quasi-experimental design, which, to our knowledge, has not been done previously. This allowed us to better disentangle the potentially confounding effects of "gene selfishness" and "meme selfishness". We hypothesized that both genetic relatedness and memetic similarity (similarity in important attitudes and values) would affect willingness to help (H1a and H2a, respectively) or, more specifically, that people would report higher willingness to help more closely related others (H1b) as well as more memetically similar others (H2b). Lastly, we expected interaction between the two factors (H3), that is, that memetic similarity would be especially relevant for unrelated individuals (e.g., Bressan et al., 2009). In the two studies, we additionally control for a range of demographic and social relationship characteristics, including emotional closeness.

Study 1

Method

Preregistration

This study was preregistered on the Open Science Framework (OSF) (https://osf.io/6udfb). Any deviations from the preregistration are noted below.

Design

The study used a 3 ("genetic relatedness") x 3 ("memetic similarity") between-subjects factorial design (see Table 1). The levels of the first factor were nonkin ($r = 0$), first cousin ($r = 0.125$), and full sibling ($r = 0.5$). The second factor was derived from participants' ratings of perceived similarity with the target individual in important attitudes and values (with options ranging from *not at all similar* to *completely similar*, on a 7-point scale). Ratings 1–3 were recoded as *dissimilar*; 4–5 as *somewhat similar*; and 6–7 as *very similar*, with each level accounting for approximately a third of the sample.

Table 1
Factor Levels and Participant Distribution Across Groups and by Sex in Study 1 and Study 2

Group	Factor 1 Levels	Factor 2 Levels	Participant Sex	Study 1 (N = 761)		Study 2 (N = 841)	
1	nonkin	dissimilar	male	86	31	122	26
			female		55		96
2	nonkin	somewhat similar	male	137	45	242	62
			female		92		180
3	nonkin	very similar	male	130	39	199	39
			female		91		160
4	cousin	dissimilar	male	81	27	49	18
			female		54		31
5	cousin	somewhat similar	male	99	20	54	13
			female		79		41
6	cousin	very similar	male	45	8	30	7
			female		37		23
7	sibling	dissimilar	male	28	6	37	7
			female		22		30
8	sibling	somewhat similar	male	96	21	65	13
			female		75		52
9	sibling	very similar	male	59	8	43	5
			female		51		38

Procedure

After providing their informed consent and indicating their age, sex, and education, participants were assigned a target individual that would be the focus of all of the succeeding questions. Participants then rated their memetic similarity with the target individual and answered questions about the target individual's demographic characteristics and their social relationship with them. The last part of the survey consisted of a scale tapping into participants' willingness to help the target individual. Finally, all participants were debriefed. The survey included two attention check questions (e.g., "Before you continue with the survey, please just select 3") to identify careless respondents. The procedure was initially tested and refined in a pilot study involving 350 people (Baucal & Lazić, 2018).

Finding the Target Individual. Participants were assigned one out of the possible six target individuals: a nonkin (r = 0), a first cousin (r = 0.125), or a full sibling (r = 0.5), either similar or not similar to them in important attitudes and values. A nonkin was defined as an acquaintance from the participant's immediate surroundings. It was specified that the target individuals had to be of the same sex as the participant. It was also specified that they had to be geographically close ("an individual who lives close enough that you could meet face-to-face the same day"; adapted from Johnson, 2001).

The assignment of target individuals was based on a set of six questions appearing in a randomized order (i.e., participants were asked whether they had an acquaintance/first cousin/full sibling who was similar/not similar to them). The first question might have asked, for example, whether the participant had a full brother/sister who was different from them in important attitudes. If they did, they were directed to a later part of the survey. If they did not, they moved on to the next question which asked about a different target individual. The participant answered such questions until they came to an individual they did have in their social network. After this, the criteria for the target individual were restated and the

participant was asked to imagine this individual (or, if they had more than one individual fulfilling the criteria, the one closer to their age) as their "Person A".

When the target individual was kin, participants were additionally asked to complete a set of control questions. They had to report whether their cousin was adopted (affirmative answer implied *r* of 0) and whether their uncle or aunt were the biological parents of their cousin (negative answer implied *r* of 0). Similarly, they had to report whether their full sibling was adopted, whether they were half-siblings, and whether they were monozygotic twins. Affirmative answers to these questions implied *r* of 0, 0.25, and 1, respectively.

The Target Individual's Demographic and Social Relationship Characteristics

The following variables were assessed as covariates:

Age. Participants indicated the age of the target individual. The *age difference* was additionally calculated by subtracting the target individual's age from the age of the participant.

Residential Distance. Participants were asked about residential distance in kilometers between themselves and the target individual. The data were transformed into a base-10 logarithmic value to account for distortions from target individuals residing extremely far away.

Frequency of Contact. Participants indicated their frequency of contact with the target individual. The means of interaction included face-to-face communication, telephone calls, email, and text messages. The frequency categories were *never*, *once per year or less*, *twice or more times per year*, *once per month*, *once per week*, *twice or more times per week*, and *daily*. These categories were assigned values of 1 (*never*) to 7 (*daily*).

Perceived Frequency of Future Contact. The frequency of future contact was assessed with one item ("How often will you be in contact with Person A during the course of the next year?"), with options ranging from *never* to *very often*, on a 7-point scale.

Perceived Probability of Future Contact. The probability of future contact was assessed with one item ("How likely is it that you will still be in contact with Person A in one year?"), with responses ranging from *not at all likely* to *highly likely*, on a 7-point scale.

Emotional Closeness. One item asked participants how emotionally close they felt to the target individual, with options ranging from *not at all close* to c*ompletely close*, on a 7-point scale (adapted from Korchmaros & Kenny, 2001).

Willingness to Help

The scale assessing willingness to help the target individual included eight items adapted from Stewart-Williams (2007, 2008). The items varied in the cost that the participant would have to incur to provide help. Two items involved low cost (emotional support and granting small favors). Four items involved medium cost (help with everyday living, help during an illness, help with housing, and financial help). Finally, two high-cost items involved life-or-death situations (rescuing someone from a burning building and donating a kidney). Participants rated their willingness to help the target individual on a 7-point scale ranging from *not at all ready* to *completely ready*, after being prompted to imagine that doing so would be practically possible. Willingness to help was assessed as the mean of eight items. The scale exhibited a high Cronbach's alpha estimate of internal consistency of .85.

Sample

A Priori Power Analysis

For Study 1, an a priori two-way ANOVA power analysis (McGarvey, 2015), with a small-to-medium two-way interaction effect size of Eta Squared (η^2) = 0.05 (estimated based on the pilot study), with the power of 95% and $\alpha = .05$, revealed a target sample size of $N = 362$.

Data Collection and Exclusion

The online survey was distributed by a marketing company through Facebook ads targeting individuals over the age of 18 who reside in Serbia. The survey was in Serbian only; participants were, therefore, Serbian-speaking. Study participation was voluntary and participants were not financially compensated. All data were collected between January 16th and January 21st, 2020.

A total of 880 participants (out of 1,374 who started the survey) completed the study. We over-recruited to ensure that all nine groups would achieve the minimum number of participants. As such, we deviated from the preregistration and did not stop data collection after 435 participants had completed the study.

Out of 880 participants, 119 (13.52%) were excluded from the analysis based on three criteria. First, six participants (0.68%) who incorrectly answered both of the two attention check questions were excluded. Second, 92 participants (10.45%) who failed the control questions (i.e., for whom the derived coefficient of relatedness did not match the kin category of the target individual) were excluded. The third criterion was not preregistered and it excluded participants who were assigned more than one or who were assigned none of the target individuals, but who still moved on to the next part of the survey. Due to these technical errors, 71 participants (8.07%) were excluded. After the exclusions, 761 participants remained.

Sample Characteristics

The final sample consisted of 761 participants; 205 were male (26.94%) and 556 female (73.06%). The detailed distribution across the nine groups is provided in Table 1. Age of the participants ranged from 18 to 74 years (M = 37.8; SD = 14.0). As for education, one participant (0.13%) reported having completed primary school only; 149 participants (19.58%) reported having attended high school, with 135 of them having graduated; 202 participants (26.54%) reported some college but no degree; around half of the participants (53.74%) were highly educated (177 reported having a bachelor's degree, 187 a master's degree, and 45 reported having a Ph.D. or equivalent).

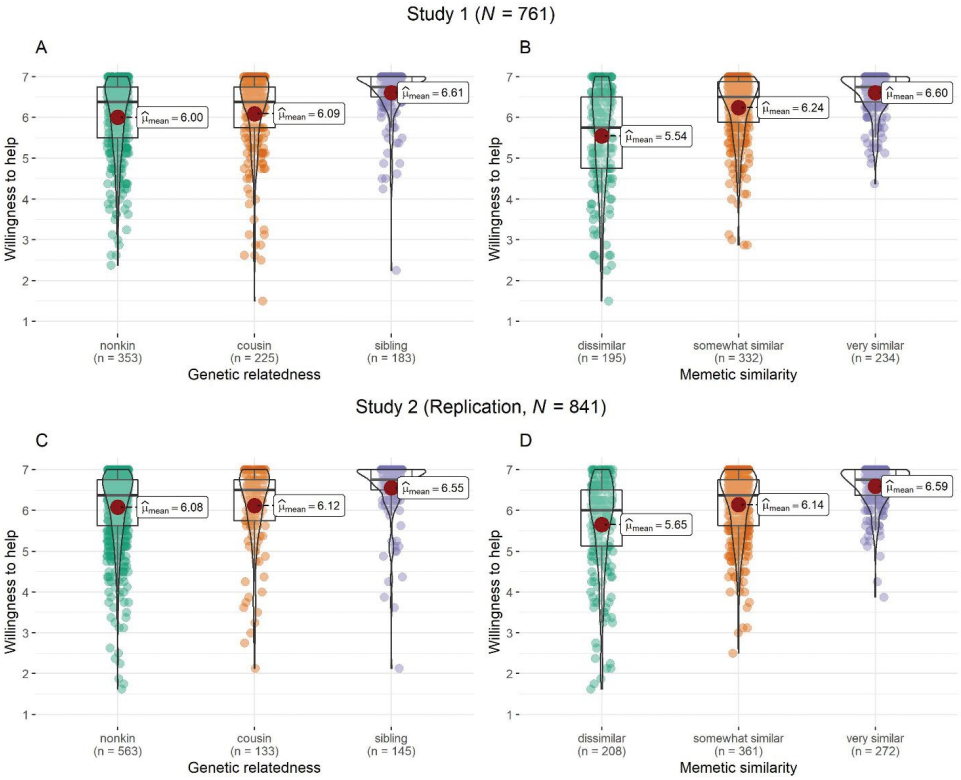
Results

The data and code are available at the OSF (https://osf.io/5fgpk). All analyses were done in R 4.0.2 (R Core Team, 2020). ANOVA and ANCOVA were performed using the lm function and the Anova function from the package {car} (Fox & Weisberg, 2019) and the figures were created using the package {ggstatsplot} (Patil, 2021). The level of statistical significance was set at p <.05.

The willingness to help scores were analyzed using a two-way ANOVA. This revealed a significant main effect of genetic relatedness (F(2, 752) = 27.75, p <.001, η^2 = .07), as well as larger, significant main effect of memetic similarity (F(2, 752) = 59.78, p <.001, η^2 = .14). There was no significant interaction between the two factors. Bonferroni's correction for multiple comparisons was used to examine differences between factor levels. This showed that all levels of genetic relatedness were significantly different from each other: willingness to help was highest for siblings (M = 6.61, SD = 0.62), and then for cousins (M = 6.09, SD = 1.01) and nonkin (M = 6.00, SD = 0.96). When it comes to memetic similarity, all levels were also significantly different from each other: willingness to help was highest for very similar target individuals (M = 6.60, SD

= 0.49), and then for somewhat similar (M = 6.24, SD = 0.79) and dissimilar ones (M = 5.54, SD = 1.22). Figure 1 illustrates how willingness to help changes with the levels of genetic relatedness and memetic similarity.

Figure 1
Effects of Selfish Genes and Selfish Memes on Willingness to Help



We also tested for a range of covariates using a two-way ANCOVA. The first group of covariates was used to control for potential differences between different subgroups of participants since participants were not assigned randomly to different subgroups. It consisted of the following demographic characteristics: sex, age, age difference, and residential distance. The second group of covariates was either associated with an objective opportunity to provide help to someone else or with potential mechanisms that can mediate the effect of genetic relatedness and memetic similarities on willingness to help. It included the following, largely subjective social relationship characteristics: frequency of contact, frequency of future contact, probability of future contact, and emotional closeness. Including these characteristics as covariates allowed us to control for potential confounding and mediating effects. The intercorrelations of rated similarity, willingness to help and these eight covariates are provided in Table 2. The use of sex and emotional closeness as covariates in Study 1 was not preregistered.

Table 2
Correlations Between Rated Similarity, Covariates, and Willingness to Help (Study 1)

Variable		1	2	3	4	5	6	7	8	9	10
1. Rated Similarity	*r*	–									
	p										
2. Sex	*r*	.07	–								
	p	ns									
3. Target's Age	*r*	-.09*	-.09*	–							
	p	.012	.013								
4. Age Difference	*r*	.05	-.03	-.29***	–						
	p	*ns*	*ns*	< .001							
5. Residential Distance	*r*	.02	.05	-.01	-.02	–					
	p	ns	ns	ns	ns						
6. Contact Frequency	*r*	.42***	.11**	-.10**	.07	-.19***	–				
	p	< .001	.002	.008	*ns*	< .001					
7. Future Contact Freq.	*r*	.48***	.13***	-.11**	.08*	-.13***	.76***	–			
	p	< .001	< .001	.002	.030	< .001	< .001				
8. Future Contact Prob.	*r*	.43***	.10**	-.06	.09**	-.02	.53***	.68***	–		
	p	< .001	.008	*ns*	.010	*ns*	< .001	< .001			
9. Emotional Closeness	*r*	.59***	.17***	-.10**	.05	.06	.54***	.61***	.57***	–	
	p	< .001	< .001	.004	*ns*	*ns*	< .001	< .001	< .001		
10. Willingness to Help	*r*	.47***	.16***	-.10**	.06	.07	.45***	.53***	.55***	.64***	–
	p	< .001	< .001	.005	*ns*	*ns*	< .001	< .001	< .001	< .001	
M		4.52	1.73	38.23	-0.42	0.75	16.58	5.66	6.32	5.17	6.17
SD		1.50	0.44	14.47	6.05	0.61	4.97	1.62	1.41	1.66	0.94
Minimum		1	1	10	-31	0.00	4.00	1	1	1	1.50
Maximum		7	2	79	23	3.40	28.00	7	7	7	7.00

Note. $N = 761$. Sex was coded 1 for male and 2 for female. Age Difference was calculated by subtracting the target individual's age from the age of the participant. Freq. = Frequency. Prob. = Probability. * $p < .05$; ** $p < .01$; *** $p < .001$.

Under the first ANCOVA model, which controlled for four demographic characteristics (sex, age, age difference, and residential distance), the results remained almost unchanged. There was a significant main effect of both genetic relatedness and memetic similarity ($F(2, 748) = 24.57$, $p < .001$, $\eta^2 = .06$ and $F(2, 748) = 55.76$, $p < .001$, $\eta^2 = 0.13$, respectively), with a non-significant interaction of these factors.

The second ANCOVA model included both the demographic and the social relationship covariates (frequency of contact, frequency of future contact,

probability of future contact, and emotional closeness). Under this model, the effect of genetic relatedness persisted ($F(2, 744) = 18.10$, $p < .001$, $\eta^2 = .05$). Memetic similarity, however, no longer had a significant effect and the interaction remained non-significant. Among the significant social relationship covariates were the probability of future contact ($F(1, 744) = 29.32$, $p < .001$, $\eta^2 = .04$) and emotional closeness ($F(1, 744) = 99.65$, $p < .001$, $\eta^2 = 0.12$).

When testing the hypotheses with the preregistered sample size ($N = 364$), the main pattern of the results remains unchanged (the supplementary report is available at the OSF, https://osf.io/yu8q6).

Study 2

The main aim of Study 2 was to test whether the key findings of Study 1 would replicate under different social conditions caused by the COVID-19 pandemic. In Serbia, the pandemic started on March 6, 2020 and the first wave lasted until May 2020 (Serbia Coronavirus, n.d.); in that period strict curfew measures were implemented. We assumed that, during a pandemic, people might change the relative significance of genetic relatedness and memetic similarity because they have found themselves in a life-threatening situation.

Method

Preregistration

This study was preregistered on the OSF (https://osf.io/4d2rh). Any deviations from the preregistration are noted below.

Design and Procedure

Study 2 closely followed the design and procedures of Study 1, except for three additional COVID-19 related questions on the last page of the survey. The first two questions asked participants about their degree of concern (*not at all worried*, *not too worried*, *somewhat worried*, *very worried*) that they or someone in their family would get seriously ill from COVID-19. The categories were assigned values of 1 to 4. The third question asked participants to what extent (*not at all*, *little*, *rather much*) the COVID-19 outbreak impacted their daily lives. The categories were assigned values of 1 to 3. A principal component analysis with no rotation was performed on the three COVID-19 related questions, revealing one factor with an eigenvalue over 1, which explained 57.13% of the total variance. Internal consistency (Cronbach's alpha) was .62. The three questions were therefore summarized into one variable – "COVID-19 related stress". This variable was then recoded into three categories based on approximate tertiles, to distinguish between *somewhat stressed* (3–6), *moderately stressed* (7–8), and *extremely stressed* participants (9–11). This transformation was not preregistered and served us to preliminary test the potential interaction effect of the COVID-19 related stress. The willingness-to-help scale maintained high internal consistency (Cronbach's alpha of .84).

Sample

A Priori Power Analysis

For Study 2, an *a priori* two-way ANOVA power analysis (McGarvey, 2015), with a small-to-medium effect size of 'genetic relatedness' of $\eta^2 = 0.063$ (estimated based on the Study

1 data, after controlling for sex, age of the target individual, age difference, and residential distance), with the power of 95% and α = .05, revealed a target sample size of $N = 239$.

Data Collection and Exclusion

Data for Study 2 were collected between April 9 and April 12, 2020, using the same procedure as in Study 1. A total of 916 participants (out of 1,485 who started the survey) completed the study. We over-recruited to ensure that all nine groups would achieve the minimum number of participants.

Out of 916 participants, 75 (8.19%) were excluded from the analysis based on the same criteria as in Study 1. Nine participants (0.98%) failed the attention checks; 45 participants (4.91%) failed the control questions regarding the coefficient of relatedness; and 30 participants (3.28%) experienced technical errors with the survey. After the exclusions, 841 participants remained.

Sample Characteristics

The final sample consisted of 841 participants; 190 were male (22.59%) and 651 female (77.41%). The detailed distribution across the nine groups is provided in Table 1. Age of the participants ranged from 18 to 82 years ($M = 39.2$; $SD = 14.6$). As for education, three participants (0.36%) reported having attended primary school only, with two of them having completed it; 111 participants (13.20%) reported having attended high school, with 89 of them having graduated; 207 participants (24.61%) reported some college but no degree; more than half of the participants (61.84%) were highly educated (241 reported having a bachelor's degree, 221 a master's degree, and 58 reported having a Ph.D. or equivalent).

Results

The same statistical tests were applied as in Study 1. The data and code are available at the OSF (https://osf.io/c4mkv).

Again, there was a significant main effect of genetic relatedness ($F(2, 832) = 21.24$, $p = .001$, $\eta^2 = .05$) and of memetic similarity ($F(2, 832) = 43.82$, $p < .001$, $\eta^2 = .10$), without a significant interaction. Willingness to help was significantly higher for siblings ($M = 6.55$, $SD = 0.73$) than for both cousins ($M = 6.12$, $SD = 0.99$) and nonkin ($M = 6.08$, $SD = 0.92$), but it did not significantly differ between cousins and nonkin. When it comes to memetic similarity, all levels were significantly different from each other: willingness to help was highest for very similar target individuals ($M = 6.59$, $SD = 0.48$), and then for somewhat similar ($M = 6.14$, $SD = 0.83$) and dissimilar ones ($M = 5.65$, $SD = 1.20$). Figure 1 illustrates how willingness to help changes with the levels of genetic relatedness and memetic similarity.

The intercorrelations of rated similarity, willingness to help and eight covariates are provided in Table 3. Under the first ANCOVA model – which controlled for demographic characteristics of sex, age, age difference, and residential distance – the results, again, remained almost unchanged. The effects of both genetic relatedness ($F(2, 828) = 20.81$, $p = 0.005$, $\eta^2 = .05$) and memetic similarity ($F(2, 828) = 41.71$, $p < .001$, $\eta^2 = .09$) were significant, while their interaction was not.

Table 3
Correlations Between Rated Similarity, Covariates, and Willingness to Help (Study 2)

Variable		1	2	3	4	5	6	7	8	9	10
1. Rated Similarity	*r*	–									
	p										
2. Sex	*r*	.08*	–								
	p	.028									
3. Target's Age	*r*	-.04	-.09*	–							
	p	*ns*	.013								
4. Age Difference	*r*	.10**	-.02	-.22***	–						
	p	.005	*ns*	< .001							
5. Residential Distance	*r*	.10**	.00	-.04	-.02	–					
	p	.004	*ns*	*ns*	*ns*						
6. Contact Frequency	*r*	.36***	.09*	-.03	.08*	-.10**	–				
	p	< .001	.011	*ns*	.015	.006					
7. Future Contact Freq.	*r*	.40***	.12***	-.05	.04	-.09*	.68***	–			
	p	< .001	< .001	*ns*	*ns*	.012	< .001				
8. Future Contact Prob.	*r*	.35***	.07	-.04	-.02	-.01	.44***	.64***	–		
	p	< .001	*ns*	*ns*	*ns*	*ns*	< .001	< .001			
9. Emotional Closeness	*r*	.56***	.11**	-.07*	.09**	.11**	.48***	.54***	.50***	–	
	p	< .001	.002	.039	.007	.001	< .001	< .001	< .001		
10. Willingness to Help	*r*	.42***	.06	-.04	.08*	.04	.42***	.49***	.52***	.56***	–
	p	< .001	*ns*	*ns*	.021	*ns*	< .001	< .001	< .001	< .001	
M		4.54	1.77	39.30	-.06	.68	17.41	5.76	6.36	5.18	6.17
SD		1.53	0.42	14.67	5.95	.59	4.43	1.47	1.25	1.59	0.92
Minimum		1	1	11	-33	0.00	4.00	1	1	1	1.63
Maximum		7	2	80	35	4.00	28.00	7	7	7	7.00

Note. $N = 841$. Sex was coded 1 for male and 2 for female. Age Difference was calculated by subtracting the target individual's age from the age of the participant. Freq. = Frequency. Prob. = Probability. * $p < .05$; ** $p < .01$; *** $p < .001$.

As in Study 1, the second ANCOVA model controlled both for demographic and social relationship characteristics of contact frequency, future contact frequency, future contact probability, and emotional closeness. Under this model, the effect of genetic relatedness persisted ($F(2, 824) = 15.77$, $p < .001$, $\eta^2 = .04$). Memetic similarity, however, no longer had a significant effect and the interaction remained non-significant. Among the significant social relationship covariates were contact frequency ($F(1, 824) = 6.34$, $p < .05$, $\eta^2 = .01$), the probability of future contact ($F(1, 824) = 40.15$, $p < .001$, $\eta^2 = .05$),

and emotional closeness ($F(1, 824) = 71.27$, $p < .001$, $\eta^2 = 0.08$). Additionally, COVID-19 related stress did not change the effect of either genetic relatedness or memetic similarity on the willingness to help.

When testing the hypotheses with the preregistered sample size ($N = 252$), the main pattern of the results remains unchanged (the supplementary report is available at the OSF, https://osf.io/yu8q6).

Discussion

Two preregistered studies suggested that both selfish genes and selfish memes have a distinct, independent effect on a person's willingness to help. Specifically, participants reported higher willingness to help more closely related others as well as higher willingness to help others who were more similar to them in important attitudes and values. While the effect of genes was small to medium (η^2 of .07 in Study 1 and .05 in Study 2), the effect of memes was relatively large (η^2 of .14 in Study 1 and .10 in Study 2; Cohen, 1988). Based on these findings, we assume that, similarly to gene selfishness, meme selfishness can also bring about altruism: individuals would rather make a personal sacrifice to help memetically similar than dissimilar others because similar others have a higher chance of spreading the helper's memes.

Both the direction and the magnitude of effects from Study 1, conducted pre-pandemic, were replicated in Study 2, during the COVID-19 pandemic, when they were not affected by the levels of the COVID-19 related stress participants experienced. Future studies could use real-world data to further inform these effects. In both studies, the effect of selfish genes and selfish memes remained largely unchanged when controlling for helpers' sex and age, the age difference between the helper and the recipient of help, and the residential distance between the two.

However, certain characteristics of the social relationship could significantly impact the effect of selfish genes and selfish memes on altruism, and this should be explored in future studies. After controlling for current and future contact frequency, future contact probability, and emotional closeness, the effects of selfish genes and selfish memes were either non-significant or negligible in magnitude. Notably, in both studies, the probability of future contact and emotional closeness were significantly related to the willingness to help: the more likely participants thought they would still be in contact with the recipient of help in one year and the more emotionally close they felt to them, the more willing they were to help them in hypothetical situations. The role of future contact is not surprising, considering that the possibility of repeated interaction and reciprocity concerns were shown to be powerful drivers of altruism (Fehr & Fischbacher, 2003; Nowak, 2006). The finding that the effect of selfish genes and selfish memes vanished when emotional closeness was controlled for is in line with some previous studies (Bressan et al., 2009; Korchmaros & Kenny, 2001, 2006) and would argue against the existence of a kinship premium or a "meme premium". Furthermore, ratings of perceived memetic similarity were

highly correlated with emotional closeness (r = .59 in Study 1 and r = .56 in Study 2). We expect that genetic relatedness and memetic similarity indirectly affect altruism through their association with emotional closeness, and this should be further investigated.

The effect of genetic relatedness could be interpreted not only in the light of inclusive fitness (Hamilton, 1964) but also in the light of the so-called fitness interdependence (Aktipis et al., 2018): two individuals who are genetically related can influence the *mutual* success of one another's genes, which motivates altruistic behavior among them. Under this conceptual framework, perceived memetic similarity, as well as feelings of emotional closeness, could be understood as proximate mechanisms for assessing and representing fitness interdependence. Therefore, to understand whether the effect of selfish memes and selfish genes could have arisen due to fitness interdependence, future studies could ask participants about the extent to which they believe their outcomes and emotions to be entwined with those of the recipient of help (Ayers et al., 2020).

In Study 2 (but not in Study 1), the willingness to help nonkin did not significantly differ from the willingness to help cousins. For nonkin, participants were prompted to imagine an acquaintance; however, this was still largely open to subjective interpretation and participants could have imagined a co-worker, classmate, friend of a friend, and so on. Furthermore, they could have, for example, imagined friends they feel closer to than cousins, which could have, in turn, contributed to higher levels of helping, especially for low– and medium-cost help; Stewart-Williams, 2007). Future experiments should, therefore, introduce more control over the relational context when it comes to the nonkin category (e.g., Clark et al., 2015). To investigate the potential moderating role of the cost of help, future studies should also expand the helping scale and increase the variability of responses to its items.

We defined memes as personally important attitudes and values since it was crucial for our research question that participants perceive the memes as personally relevant. However, this means that participants could have imagined various personal and social values, with varying degrees of specificity, persistence, and cultural importance. To control for this, future studies could operationalize memes more precisely.

The findings also need to be discussed by taking into consideration the wider social context and social trends. The role of selfish memes might depend on the degree of social polarization in a country. In the context of highly polarized societies, memetic similarity could be prioritized to support others with similar political and social views to prevail in a cultural or an identity war. Thus, the study could be replicated in countries with different trends in political polarization (Boxell et al., 2020) and some fundamental values that are (or are not) shared across social groups, such as different ethnic groups, could be investigated. Such findings would further shed some light on whether selfish memes have possibly evolved as a type of norms or institutions to foster solidarity and altruism in large unrelated groups of modern societies (Henrich et al., 2010), and may even suggest the possibility that social mechanisms could

"hijack" biological and psychological processes in specific social and cultural conditions, as proposed by the sociocultural approach (Vygotsky, 1934/2012).

References

Aktipis, A., Cronk, L., Alcock, J., Ayers, J. D., Baciu, C., Balliet, D., Boddy, A. M., Curry, O. S., Krems, J. A., Muñoz, A., Sullivan, D., Sznycer, D., Wilkinson, G. S., & Winfrey, P. (2018). Understanding cooperation through fitness interdependence. *Nature Human Behaviour*, *2*(7), 429–431. https://doi.org/10.1038/s41562–018–0378–4

Ayers, J. D., Sznycer, D., Sullivan, D., Guevara Beltrán, D., Van den Akker, O., Muñoz, A., Hruschka, D. J., Cronk, L., & Aktipis, A. (2020, May). *A new measure of perceived interdependence: Factor structure and validity*. (Preprint). https://doi.org/10.31234/osf.io/7yzhd

Balliet, D., Wu, J., & De Dreu, C. K. W. (2014). Ingroup favoritism in cooperation: A meta-analysis. *Psychological Bulletin*, *140*(6), 1556–1581. https://doi.org/10.1037/a0037737

Baucal, A., & Lazić, A. (2018, March). *Sebični geni ili sebični memi [Selfish genes or selfish memes]*. Paper presented at the 24th Empirical Studies in Psychology, Belgrade, Serbia. http://empirijskaistrazivanja.org/wp-content/uploads/2018/03/2018-KNJIGA-REZIMEA.pdf

Betzig, L. L., & Turke, P. W. (1986). Food sharing on Ifaluk. *Current Anthropology*, *27*(4), 397–400. https://doi.org/10.1086/203457

Blackmore, S. (2000). *The meme machine*. Oxford University Press.

Boxell, L., Gentzkow, M., & Shapiro, J. (2020, January). *Cross-country trends in affective polarization*. (Working Paper No. 26669). https://doi.org/10.3386/w26669

Bressan, P., Colarelli, S. M., & Cavalieri, M. B. (2009). Biologically costly altruism depends on emotional closeness among step but not half or full sibling. *Evolutionary Psychology*, *7*(1), 147470490900700. https://doi.org/10.1177/147470490900700116

Burnstein, E., Crandall, C., & Kitayama, S. (1994). Some neo-Darwinian decision rules for altruism: Weighing cues for inclusive fitness as a function of the biological importance of the decision. *Journal of Personality and Social Psychology*, *67*(5), 773–789. https://doi.org/10.1037/0022–3514.67.5.773

Castle, J. (2018). New fronts in the culture wars? Religion, partisanship, and polarization on religious liberty and transgender rights in the United States. *American Politics Research*, *47*(3), 650–679. https://doi.org/10.1177/1532673x18818169

Cialdini, R. B., Brown, S. L., Lewis, B. P., Luce, C., & Neuberg, S. L. (1997). Reinterpreting the empathy–altruism relationship: When one into one equals oneness. *Journal of Personality and Social Psychology*, *73*(3), 481–494. https://doi.org/10.1037/0022–3514.73.3.481

Clark, M. S., Boothby, E. J., Clark-Polner, E., & Reis, H. T. (2015). Understanding prosocial behavior requires understanding relational context. In D. A. Schroeder & W. G. Graziano (Eds.), *The Oxford handbook of prosocial behavior* (pp. 329–345). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780195399813.013.37

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Curry, O., Roberts, S. G. B., & Dunbar, R. I. M. (2012). Altruism in social networks: Evidence for a "kinship premium." *British Journal of Psychology*, *104*(2), 283–295. https://doi.org/10.1111/j.2044–8295.2012.02119.x

Dawkins, R. (2016). *The selfish gene: 40th anniversary edition* (4th ed). Oxford University Press.

Fehr, E., & Fischbacher, U. (2003). The nature of human altruism. *Nature*, *425*(6960), 785–791. https://doi.org/10.1038/nature02043

Flinn, M. V. (2011). Evolutionary anthropology of the human family. In C. Salmon & T. K. Shackleford (Eds.), *Oxford library of psychology. The Oxford handbook of evolutionary family psychology* (pp. 12–32). Oxford University Press.

Fox, J., & Weisberg, S. (2019). *An {R} Companion to Applied Regression* (3rd ed). Sage.

Hamilton, W. D. (1964). The genetical evolution of social behaviour I, II. *Journal of Theoretical Biology*, *7*(1), 1–52. https://doi.org/10.1016/0022–5193(64)90038–4

Henrich, J., Ensminger, J., McElreath, R., Barr, A., Barrett, C., Bolyanatz, A., Cardenas, J. C., Gurven, M., Gwako, E., Henrich, N., Lesorogol, C., Marlowe, F., Tracer, D., & Ziker, J. (2010). Markets, religion, community size, and the evolution of fairness and punishment. *Science*, *327*(5972), 1480–1484. https://doi.org/10.1126/science.1182238

Johnson, A. J. (2001). Examining the maintenance of friendships: Are there differences between geographically close and long-distance friends?. *Communication Quarterly*, *49*(4), 424–435. https://doi.org/10.1080/01463370109385639

Koch, I. (2017). What's in a vote? Brexit beyond culture wars. *American Ethnologist*, *44*, 225–230. https://doi.org/10.1111/amet.12472

Korchmaros, J. D., & Kenny, D. A. (2001). Emotional closeness as a mediator of the effect of genetic relatedness on altruism. *Psychological Science*, *12*(3), 262–265. https://doi.org/10.1111/1467–9280.00348

Korchmaros, J. D., & Kenny, D. A. (2006). An evolutionary and close-relationship model of helping. *Journal of Social and Personal Relationships*, *23*(1), 21–43. https://doi.org/10.1177/0265407506060176

Krebs, D. (1975). Empathy and altruism. *Journal of Personality and Social Psychology*, *32*(6), 1134–1146. https://doi.org/10.1037/0022–3514.32.6.1134

Madsen, E. A., Tunney, R. J., Fieldman, G., Plotkin, H. C., Dunbar, R. I. M., Richardson, J.-M., & McFarland, D. (2007). Kinship and altruism: A cross-cultural experimental study. *British Journal of Psychology*, *98*(2), 339–359. https://doi.org/10.1348/000712606x129213

Marlowe, F. W. (2010). *The Hadza: Hunter-gatherers of Tanzania*. University of California Press.

McGarvey, A. (2015). easypower: Sample Size Estimation for Experimental Designs. R package version 1.0.1. https://CRAN.R-project.org/package=easypower

Neyer, F. J., & Lang, F. R. (2003). Blood is thicker than water: Kinship orientation across adulthood. *Journal of Personality and Social Psychology*, *84*(2), 310–321. https://doi.org/10.1037/0022–3514.84.2.310

Nolin, D. A. (2010). Food-sharing networks in Lamalera, Indonesia. *Human Nature*, *21*(3), 243–268. https://doi.org/10.1007/s12110–010–9091–3

Nowak, M. A. (2006). Five rules for the evolution of cooperation. *Science*, *314*(5805), 1560–1563. https://doi.org/10.1126/science.1133755

Patil, I., (2021). Visualizations with statistical details: The 'ggstatsplot' approach. *Journal of Open Source Software*, *6*(61), 3167, https://doi.org/10.21105/joss.03167

Pollet, T. V., Roberts, S. G. B., & Dunbar, R. I. M. (2013). Going that extra mile: Individuals travel further to maintain face-to-face contact with highly related kin than with less related kin. *PLoS ONE*, *8*(1), e53929. https://doi.org/10.1371/journal.pone.0053929

R Core Team. (2020). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/

Worldometer. (n.d.). *Serbia Coronavirus Cases*. Retrieved January 4, 2021, from https://www.worldometers.info/coronavirus/country/serbia/

Sole, K., Marton, J., & Hornstein, H. A. (1975). Opinion similarity and helping: Three field experiments investigating the bases of promotive tension. *Journal of Experimental Social Psychology*, *11*(1), 1–13. https://doi.org/10.1016/s0022–1031(75)80004–7

Stewart-Williams, S. (2007). Altruism among kin vs. nonkin: effects of cost of help and reciprocal exchange. *Evolution and Human Behavior*, *28*(3), 193–198. https://doi.org/10.1016/j.evolhumbehav.2007.01.002

Stewart-Williams, S. (2008). Human beings as evolved nepotists. *Human Nature*, *19*(4), 414–425. https://doi.org/10.1007/s12110–008–9048-y

Tifferet, S., Pollet, T., Bar, A., & Efrati, H. (2016). Predicting sibling investment by perceived sibling resemblance. *Evolutionary Behavioral Sciences*, *10*(1), 64–70. https://doi.org/10.1037/ebs0000035

Vygotsky, L. (1934/2012). *Thought and language – Revised and expanded edition*. MIT Press.

Xue, M. (2013). Altruism and reciprocity among friends and kin in a Tibetan village. *Evolution and Human Behavior*, *34*(5), 323–329. https://doi.org/10.1016/j.evolhumbehav.2013.05.002

Sebični geni ili sebični memi: Efekti genetske sličnosti nasuprot sličnosti u vrednostima na altruizam

Aleksandar Baucal & Aleksandra Lazić

Univerzitet u Beogradu, Filozofski fakultet, Odeljenje za psihologiju, Srbija

Dva pre-registrovana kvazi-eksperimenta imala su za cilj da razdvoje efekte sebičnih gena i sebičnih mema na samoprocenjenu spremnost ispitanika da pomogne u hipotetičkim svakodnevnim situacijama pomaganja kao i u situacijama života ili smrti. Memi su operacionalizovani kao opaženi nivo sličnosti u pogledu važnih stavova i vrednosti između osobe koja učestvuje u istraživanju i odabrane ciljne osobe. Ovu sličnost procenjuje i o njoj izveštava učesnik u studiji. U studiji 1 (N = 761), altruizam je bio najviši za rođenu braću i sestre, a potom za braću i sestre od ujaka, tetke ili strica i za nesrodnike; veća memetska sličnost je takođe bila povezana sa izraženijim altruizmom; dok interakcija između ova dva faktora nije bila značajna. U studiji 2 (N = 841), sprovedenoj tokom pandemije COVID-19, altruizam je bio najviši za rođenu braću i sestre, ali isti za braću i sestre od ujaka, tetke ili strica i nesrodnike; efekat memetske sličnosti se ponovio i ovde; interakcija se takođe ponovo pokazala neznačajnom. U obema studijama je kontrolisan niz demografskih varijabli kao i varijabli koje se tiču karakteristika socijalnih odnosa, a rezultati su ukazali na važnost uloge očekivane verovatnoće kontakta u budućnosti i emocionalne bliskosti. Predlažemo da, slično sebičnosti gena, sebičnost mema takođe može voditi ka altruizmu: pojedinci će radije podneti ličnu žrtvu da pomognu nekome ko je memetski sličan njima nego nekome ko im nije sličan, jer slične osobe imaju više šansi da prošire meme pomagača.

Ključne reči: sebični geni, sebični memi, pomaganje, srodnički altruizam

RECEIVED: 07.11.2021.
REVISION RECEIVED: 07.01.2022.
ACCEPTED: 07.01.2022.