Increased Self-Sacrificing Behavior in Favor of Fictive Kin Compared to Non-Kin

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Master's Thesis in Psychology

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Abstract for master's thesis

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Abstract:

Fitness can be increased from an individual engaging in self-sacrificing behaviors that benefit kin, but not from behaviors that benefit non-kin. Kinship cues (i.e., mechanisms that separate kin from non-kin) include association, phenotypic similarity, and linguistic cues. It has been hypothesized that self-sacrificing behavior towards non-kin could be increased by manipulating kinship cues (e.g., increasing similarity between non-kin). In the present thesis, we experimentally tested this hypothesis by manipulating kinship cues in a multiple shot variation of the Public Goods game. In this game an unpleasant noise was used as currency and participants could choose between listening to the unpleasant noise themselves (i.e., self-sacrificing choice) or to divide the noise between all players. The participants ($n = 32$) were divided into two groups: in the experimental group, kinship cues were present to increase perceived kinship; in the control group, kinship cues were absent to decrease perceived kinship. As expected, self-sacrificing choices were more common in the experimental (vs. control) group, but the initially high self-sacrificing behavior declined relatively fast. We discuss the implication of these results to the notion that self-sacrificing behavior can be increased by inducing perceived kinship.

Key words: induced altruism, kinship cues, fictive kin, self-sacrificing behavior, phenotypic similarity, association, linguistic cues, Public Goods game

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Abstrakt:
Eftersom en individs fitness definieras inte bara som den reproduktiva framgången av ens avkomma utan innebär också den reproduktiva framgången av ens släktingars avkomma, är det viktigt att individen på ett reliabelt sätt känner igen sina släktingar. Mekanismer som har utvecklats för att fylla den funktionen är ledtrådar om släktskap, så som association, fenotypisk likhet och lingvistiska ledtrådar. På grund av att dessa ledtrådar om släktskap är sårbara för felaktighet har det ställts en hypotes om att det skulle vara möjligt att inducera självuppoffrande beteende mot en fiktiv släkting (engl. fictive kin) genom att manipulera ledtrådar om slätkskap, något som man ser i organisationer som kräver kostsamma uppoffranden av sina medlemmar så som religiösa, terrorist- och militärorganisationer. Syftet med denna studie var att studera experimentellt om man kan inducera självuppoffrande beteende mot fiktiva släktingar i en online spelmiljö. 32 individer rekryterades från elevkårerna i universiteten och yrkeshögskolor i Åbo och delades i experiment- och kontrollgrupp. Spelet var en multipel-skott Public Goods spel där en obehaglig ljud användes som valuta. Det upptäcktes en signifikant effect av grupp på självuppoffrande beteende. Resultaten stöder föreställningen om att självuppoffrande beteende mot fiktiva släktingar kan induceras.

Nyckelord: inducerad altruism, ledtrådar om släktskap, fiktiv släkting, självuppoffrande beteende, fenotypisk likhet, association, lingvistiska termer, Public Goods-spel	
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Humans sometimes engage in extreme altruistic behaviors such as self-sacrificing behavior, even when it is not directly to their own benefit or to the benefit of their close kin. An example of such self-sacrificing behavior could be volunteer forces, for example the Scandinavian volunteers that participated in the Winter War in Finland. The explanation behind these kinds of behaviors could lie in inclusive-fitness theory (Hamilton, 1964) and the concept of fictive kin.

Inclusive Fitness Theory as an Explanation to Altruism

An individual's biological fitness is not defined only by the number or the reproductive success of his or her *own* offspring. According to the gene's-eye view of evolution (Dawkins, 1976), fitness is measured by the total number of allele copies that are passed on to future generations—independently of whether these are passed on through direct offspring or indirectly through the offspring of relatives. This view is captured by the *inclusive-fitness theory* (Hamilton, 1964), which shows how an allele that results in aiding biological kin can spread in the population even if the aid comes at some cost to the actor (and the actors own direct reproduction). If there is a set of allele copies that predisposes us to invest in our kin's well-being, there is a high probability of our kin also having the same allele copies. Because our siblings and cousins (and their offspring) have an increased probability of carrying the same allele copies that we are carrying, our investment in their well-being can also enhance the probability that these alleles are propagated to coming generations. Likewise, alleles that contribute to us *not* acting in a harmful manner towards our kin can also spread in the population.

One specific form of altruism is self-sacrificing behavior, where the actor puts him or herself in harm's way in favor of his or her kin. In principle, even risking one's own life to save the lives of three siblings could be explained through inclusive-fitness theory. Each sibling has a 50% chance of carrying the same allele copies as oneself, and therefore their survival, in total, may propagate more allele copies to future generations than one would by surviving oneself. Thus, according to Hamilton's (1964) theory, self-sacrificing behavior is explainable in evolutionary terms if it increases inclusive fitness. Indeed, there is abundant support for this. For example, more altruistic behavior is displayed towards closely (vs. more distantly) related kin (Burnstein, Crandall, & Kitayama, 1994; Essock-Vitale & Mcguire, 1980; Madsen et al., 2007), and detrimental behavior such as inbreeding is avoided

as a function of relatedness (Lieberman & Antfolk, 2015; Antfolk, Karlsson, Bäckström, & Santtila, 2012).

Cue-based Mechanisms of Kinship Recognition

For kin selection (i.e., differential displays of social behavior such as altruism that selectively benefit kin) to function, kin must reliably be recognized as such. Kin recognition relies on so-called kinship cues. Although the precise number of these kinship cues is not clear, some cues have been identified. One mechanism of kin recognition that might be functional in all types of family relations is phenotypic similarity. Phenotypic similarity has mostly been studied in the form of facial self-resemblance. Facial self-resemblance has been shown to facilitate group cooperation (Krupp, Debruine, & Barclay, 2008), trust (DeBruine, 2002) and prosocial attributions (DeBruine, 2005; DeBruine et al., 2011). In addition to facial similarity, phenotypic similarity has also been studied in other forms. For example, there is some support for an olfactory component in kin recognition (Cernoch & Porter, 1985; Gall, 2000). In addition, studies provide some support to the notion of behavioral similarity (e.g., having similar attitudes) also being part of kinship recognition (Antfolk, Lindqvist, Albrecht, & Santtilla, 2014; Park & Schaller, 2005). In sum, similarity seems to increase perceived relatedness and increase altruistic behavior.

Another kinship cue is association. Association refers to a cue that is based on the notion that genetic relatedness and time spent together during childhood usually correlate positively. This kinship cue is also central to the Westermarck effect (Westermarck, 1921), according to which individuals raised together avoid each other sexually later in life. Support for this effect has been found in various cultures. In studies on Israeli kibbutzim communities, no marriages between individuals raised in the same peer group were found (Shepher, 1971; Talmon, 1964). A study on Taiwanese marriages found that women forced to marry a unrelated man, together with whom she had been raised, bore fewer children than those who married a man they had not grown up together with (Wolf, 1970). In addition to increasing sexual aversion, association has also been shown to have an increasing effect on altruistic behavior towards peers (Lieberman & Lobel, 2012).

A third kinship cue, which can be used in all types of family relationships, is the use of kin labels. Kin labels are used in all types of families, from nuclear families to adoptive families and families with stepchildren and -parents. Support for

kin labels as kinship cues can be found for example in namesaking. In namesaking, an unrelated child is named after oneself or someone else in the biological family. This type of namesaking has been shown to facilitate the integration of the child into the family (Furstenberg, Frank & Talvitie, Kathy, 1980). Kin labels, such as "sibling". have also been shown to evoke more positive responses than other affiliative labels, such as "friend" (Salmon, 1998). From an evolutionary perspective, linguistic cues of kinship are considered to be more recent adaptations than the two before mentioned kinship cues, because of the relatively recent development of language (Park, Schaller, & Van Vugt, 2008). However, kin labels seem to increase altruistic behavior.

Kinship Recognition Mechanisms and their Proneness to Error

Although mechanisms of kinship recognition have been maintained through the ancestral environments because of their efficiency, they are also vulnerable to error (Park et al., 2008). When kin recognition cues affect social behavior also in non-kin contexts, this can be described as such an error. Examples of such contexts are adoptive families and families with stepchildren and -parents. In these families, the parents often invest in children, although this investment is not evolutionarily beneficial (Hamilton, Cheng, & Powell, 2007). Another example of a non-kin context is friendship relations. It has been found that especially women find imagining sex with a close friend disgusting (Ackerman, Kenrick, & Schaller, 2007; Park et al., 2008), and that this activates mechanisms to avoid incest, which is adaptive only in actual kin relations. In all the above examples, an unrelated individual is the target a behavioral response that is an evolutionary adaptation to benefit kin. In these contexts, the concept "fictive kinship" has been used.

Fictive Kinship and Self-sacrificing Behavior

Fictive kinship can be understood as the lack of biological relatedness between individuals or groups who label and/or treat each other as kin (Wagner, 1995). The theory of *induced altruism* is based on the notion of fictive kinship (Qirko, 2013). Induced altruism is defined by Badcock (as cited in Qirko, 2013, p. 133) as "behavior that benefits the reproductive success of its recipient at a cost to that of its provider, but without a resulting benefit to the altruist". Qirko (2013) suggests that many organizations, which require costly sacrifices by their members, manipulating kinship cues may increase members' self-sacrificing behavior and reinforce their commitment to the organization. For example the suicide cadres of

the Liberation Tigers of Ramil Eelam, nicknamed "Black Tigers" for the color of their uniforms, call each other brother and sister, and their leader "the elder brother", according to Sornarajah (2004). Some of these cadres commit suicide for the benefit of the group. Another example stems from as early as 1350 B.C.E. when Egyptian armies used small units of ten to enable kin-like bonding in the units. Today, small unit cohesion is considered one of the corner stones of military motivation (Pitman, 2011). Such units are also examples of isolation, where the association to one's own family is cut off. The association with family is replaced by an association to other members of one's unit. In these examples, self-sacrificing behavior is reflected in one's willingness to fight or even die for one's unit, that is, extreme forms of self-sacrificing behavior.

Although other explanations, such as coercion, personality factors and ideology play their part in explaining the behavior of members in such organizations, Qirko (2013) argues that the model of induced altruism and fictive kin has a high explanatory values due to its ability to explain also costly altruistic behaviors, such as self-sacrificing behaviors. To date, this theory has, however, not been tested experimentally.

Aims and Hypothesis of the Present Study

In the present study, the aim was to investigate whether self-sacrificing behavior could be experimentally induced by manipulating kinship cues in an online game with a multiplayer environment. The game environment consisted of the participant and a set of fictive co-players. The participants' task was to choose between listening to an unpleasant noise (i.e., display self-scarifying behavior) or evenly dividing the noise between the participant and the fictive co-players.

Following the theory outlined above, our hypothesis was that when cues indicate kinship between the participant and the fictive co-players, the participant would be more inclined to act in a self-sacrificing manner compared to when there were no cues indicating kinship between the participant and the fictive co-players.

In addition, it was expected that the players would begin with an altruistic play style which would then gradually decline and become more selfish (Fischbacher, Gächter, & Fehr, 2000; Ledyard, 1993; Rapoport, 1988).

Method

Participants

Thirty-two participants (17 women and 15 men) were recruited from the student body of universities and polytechnic schools in Turku, Finland. Participants were recruited both by posting a recruitment letter to email-lists and through face-to-face recruiting. Six of the participants were Finnish-speaking and the other 26 participants were Swedish-speaking. Participants were divided into an experimental group and an active-control group with 16 individuals in each group. Participants were allocated to groups in the order of enrolling. The first four men and the first four women were placed in the experimental group, and the following four women and men were placed in the control group. This placement was repeated, until both the experimental and the control group included 16 participants.

Before conducting the study, the research plan was approved by the Ethics Committee at the department of Psychology, Åbo Akademi University.

Instruments

Self-sacrificing behavior was measured by using an adapted version of the computerized multiple shot Public Goods game. This version differs from the original Public Goods model in that instead of using money, an unpleasant noise (Johansson et al., 2012) was used as currency. This was done in order to better model self-sacrificing behavior. The game was set up in the following way: there were four players, one participant and three non-player characters (NPC). The NPC were programed with predetermined choices. The participants were misled to believe that they were playing against real players. Each player had a coin in the game and was told that the coin represented a certain amount of noise, but the exact duration of this noise was not disclosed. The duration of the noise was in reality two seconds. It was argued that knowing the exact duration was irrelevant for the purpose of this study and telling the participants about the exact duration could have resulted in the participants focusing on it too much. The players were asked to make a choice regarding whether to keep their coin for themselves and listen to the noise or to put the coin into a common pool of noise, which was visualized in the middle of the game field. If the participant added the coin to the common pool of noise, the noise duration was multiplied by 1.3 and after this divided evenly between all four players. This multiplying is needed in order to create different outcomes depending on the participant's choice and has been used earlier in Public Good Games (Isaac &

Walker, 1994). The amount of noise each player had to listen to thus depended on their own choice (whether to keep their own noise coin or not) and the choices of the three NPCs. After each round the raw amount of each player's noise was also raised to the second power. This was done in order to increase variation, because Weber's law (as cited in Augustin, 2009, p. 1) states that the ability to tell a difference between two amounts of time depends, not on their absolute, but on their relative, difference. With longer sequences more difference is needed in order to detect it. See Table 1 for examples of the principles of the game. The game consisted of 20 rounds and the NPCs were programmed to play in the same way with each participant. In multiple shot Public Goods games, the usual pattern is that players begin with an altruistic playing style which then gradually declines and becomes more selfish (Fischbacher et al., 2000; Ledyard, 1993). Therefore the formula 2^{4-k}, where k is the sequential number of the NPC that stops playing self-sacrificingly, was used to describe the density with which the NPCs would stop keeping the noise coin and instead put it into the common pool of noise (see Fig 1.). Random variation was added differing from the formula at rounds 3 and 9 (see Fig.1, Panel B) to make it seem more realistic for the human player. It was thought important for the players to think of the situation and NPCs as real, because otherwise it could have affected how they played and therefore risk the generalizability of the results. The effect was thought to be in the direction of lowering the players' willingness to play self-sacrificingly, since their actions would not cause pain for any real person.

A measure of whether the participants believed in the online nature of the game was included in order to be able to check for the before mentioned effect. Beliefs were coded as: 1) did not at all believe the game was online, 2) could not tell for sure if the game was online or not and 3) thought the game was online.

Manipulations of kinship cues for fictive kin vs. non-kin included a manipulation of linguistic cues, isolation, and phenotypic similarity.

The linguistic cues were manipulated through the name of the game and through the text above the picture of each NPC. "The Family Game" and "Sibling" were used in the experiment group to describe the game and the co-players. For the control group the game was called "The Friend Game" and the co-players "Friends" (see Figure 2).

An assignment before playing the game was used to manipulate the amount of psychological isolation between the participants and their biological family. The

assignment in the control group was to describe with a few sentences some past cooperative action that took place with a full-sibling, mother or father. The assignment was also included in the experimental condition in the form of describing cooperative behavior with a friend, in order to control for a possible bias that would have been caused by emotional state induced by the assignment.

Phenotypical similarity between the participant and the NPC was manipulated by morphing the pictures of players with those of the NPCs. This was done using Abrasoft Fantamorph (5.4.2). Photos were taken with a Konica Minolta Dynax 5 D camera. The participants were told to have a neutral face expression when photographed. The ears, the lower part of jaw and the majority of the forehead were cropped away and 49 different points in the face were used in morphing (see Figure 1, Panel A). For the experimental group, the NPCs' faces were blended with the player's face so that the participants face constituted 25% of the final image. A ratio of 40:60 has been estimated to be the critical for detecting resemblance to self (DeBruine, 2002). In the control group, the NPCs' faces were morphed with another face (not the human player's) with the same ratio. This was done to control for possible effects caused by morphing per se. The photos were then cropped to size 150x200 pixels.

Table 1

An Example of Game Principles: Seconds of Noise put into the Common Pool of Noise by the Human Player and the Non-Player Characters (NPCs).

Round	Human Player	NPC 1	NPC 2	NPC 3	Common pool of noise x 1.3	For each player from the common pool of noise	Human Player noise (own noise + common pool of noise)^2	NPC 1
1	0	0	0	0	0	0	4	4
2	0	2	0	0	2 x 1.3 = 2.6	0.65	7	0.4
3	0	2	2	0	4 x 1.3 = 5.2	1.3	10.9	1.7
4	0	2	2	2	6 x 1.3 = 7.8	1.95	15.6	3.8
...								
20	2	2	2	2	8 x 1.3 = 10.4	2.6	6.8	6.8

Note. NPC = non-player character. The amount of noise that players put in the common pool of noise was multiplied by 1.3 after which it was evenly distributed to the human player and NPCs. For each player the resulting noise consisted of noise from the common pool of noise and their own noise coin if they chose to keep it to themselves. The resulting noise was then raised to the second power. A comparison of the human player and NPC 1 shows how different the amounts of noise being listened to could be.

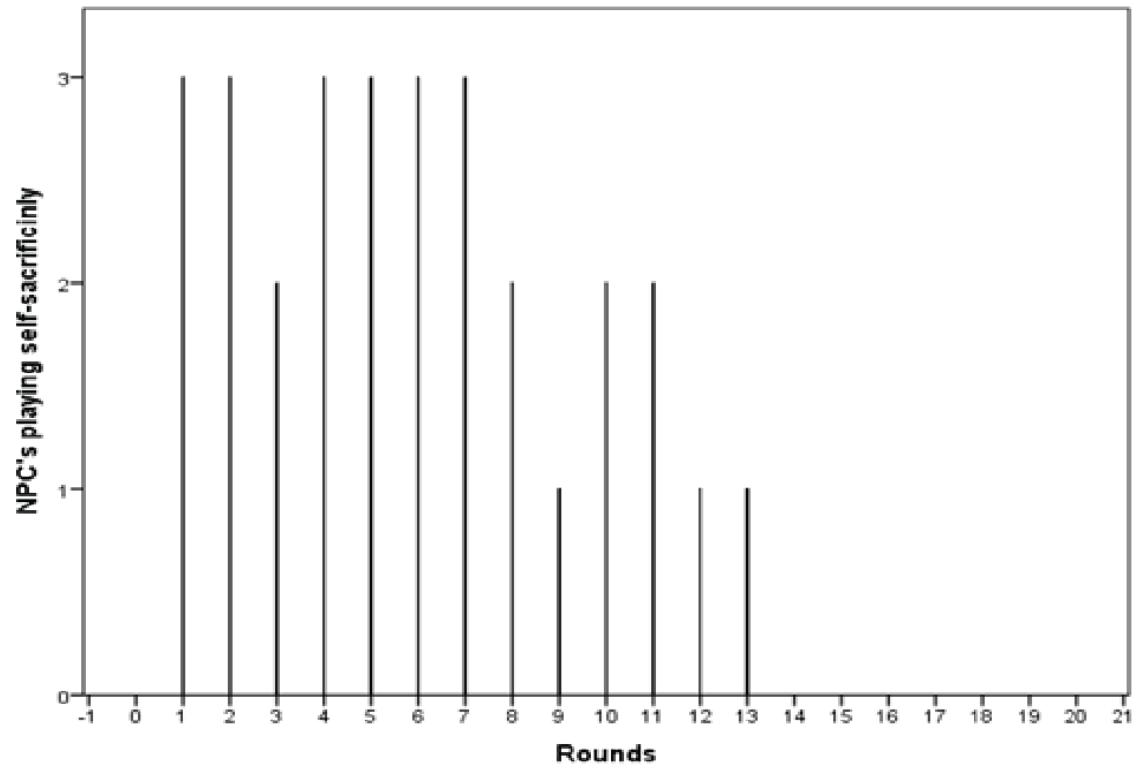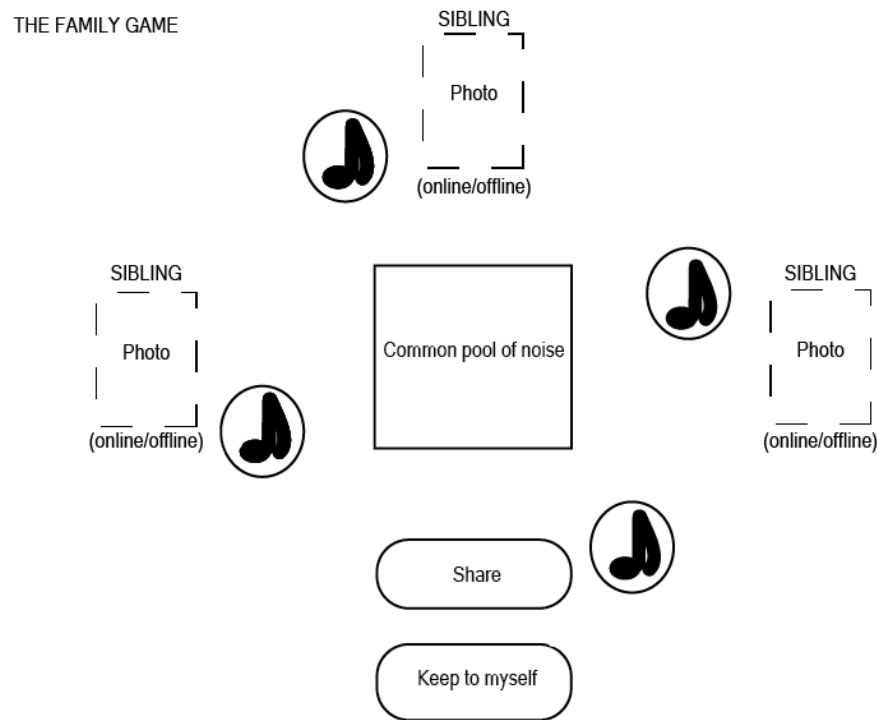Panel A
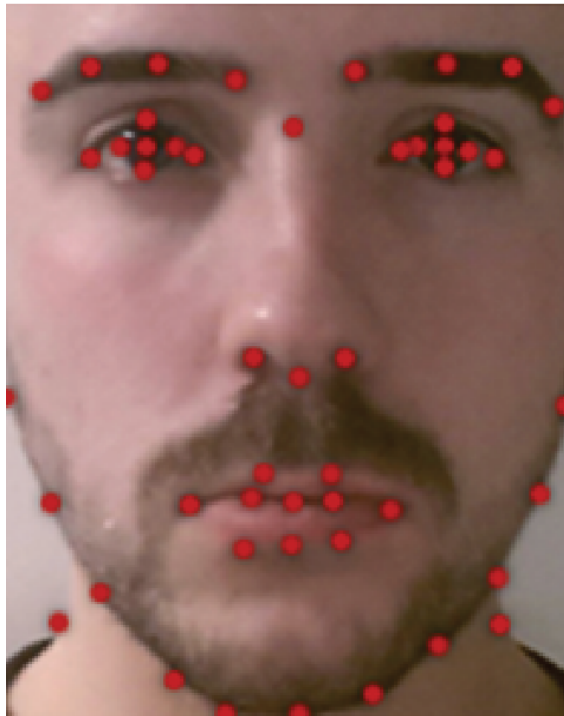
Panel B

Figure 1. **Panel A**: 49 different morphing points. **Panel B**: The programmed playing style of the NPCs' following the formula 2^{4-k} with exception at rounds 3 and 9. On the x-axis are rounds and on the y-axis the amount self-sacrificing NPC's on a given round thus keeping the noise coin to themselves. Observe the declining pattern of self-sacrificing playing style.
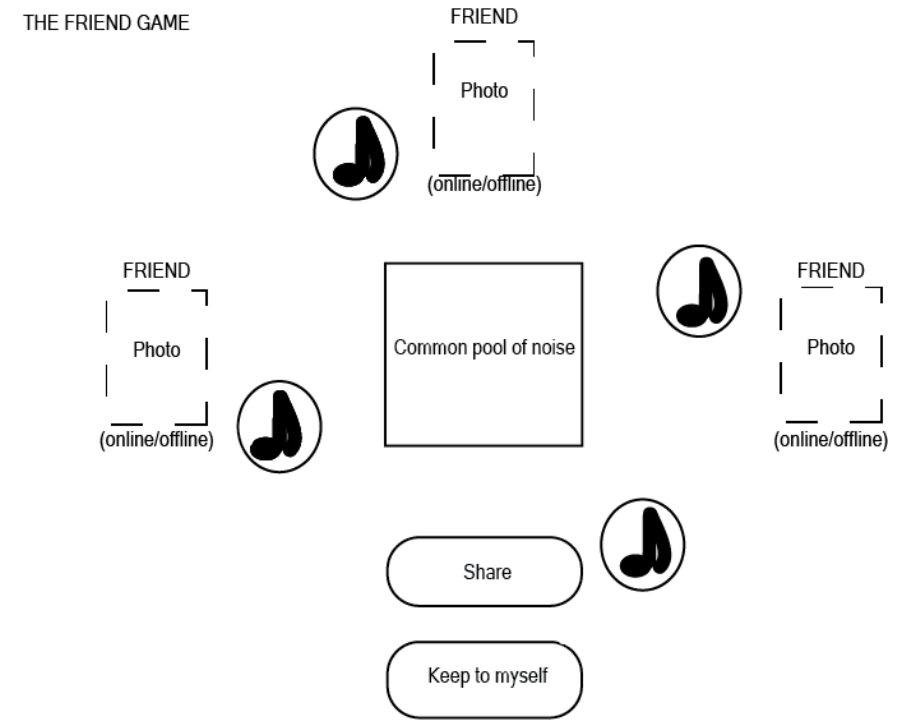
Figure 2. **Panel A:** The experimental condition. Linguistic cues are present in the form of kinship labels above participant photos and in the name of the game in the upper left corner. Phenotypic similarity is present in the photos. The third manipulated cue association was present in the form of an assignment on paper. Noise coins, participant's choices and the common pool of noise are presented. **Panel B**: Control condition with linguistic kinship cues and phenotypic similarity absent. Instead of linguistic cues, the emotionally loaded label friend was used.

Procedure

Participants participated in two meetings. Both meetings were between the participant and the research administrator. During the first meeting participants signed an informed consent, where participants were told they could terminate their participation at any time and that all information would be handled with confidence and their pictures would be destroyed six months after the experiment. Participants were also informed that the study was about cooperative behavior and that the study would be carried out as an online game. After this, participants were photographed. Participants could then choose a convenient time for the second meeting using an online calendar.

During the second meeting they participated in the actual game phase of the study. When arriving for the second meeting the research administrator led the participant to a room where the game was set up. There was no one else in the room. The participant was first given the assignment concerning past cooperative behavior either with a friend (experimental condition) or with a full sibling, mother or father (control condition). During the assignment, the research administrator would go and pretend to make a call to his/her research assistant, informing the assistant that the participant would soon appear online. The research administrator would then enter the room again, and when the participant was finished with the assignment, he/she was given the instructions for the game. He or she was briefed to read through the instructions, ask if anything was unclear, and after reading the instructions give an explanation/description of what it was he/she was supposed to do in the game. This was done to make sure the participant had understood the instructions. The participant was then told to put on headphones and that they could start playing after all the participants had come online. The research administrator was in the room during the experiment. After the 20th and final round, the participant was enquired about what it felt like to play, how cooperative he or she thought he or she had played, and how he or she thought the others had played. The participant was also asked whether he or she knew any one of the other players. After that, the participant was informed that he or she had played against a computer. The participant was enquired about whether he or she had known that he or she was not online during the game. If the answer was affirmative, an additional question was made regarding whether the participant had been sure about the situation being staged. The

participant was also told about the different manipulations used: phenotypical similarity, association and linguistic cues, and how they were presented.

Statistical analysis

To analyze the results, we used the lme4 package (Bates, Mächler, Bolker, & Walker, 2015) for R (R Core Team, 2008). Figure 3 was generated using the sjPlot (Lüdecke, 2016) and ggplot2 (Wickham, 2009) packages.

Our data consisted of 640 responses (32 participants with 20 rounds per participant). Because the 640 responses were clustered within participants, we used a multi-level model allowing random intercepts for participants. This was done using *glmer* function in lme4. The *glmer* function can be used for binary logistic regression, while accounting for dependency in the responses. Before proceeding to our main analysis, we investigated whether there was an effect of biological sex on the probability to make a self-sacrificing choice. We found no difference between the sexes ($p = .286$) and thus did not consider sex in the subsequent analyses. We also investigated whether the belief in the online nature of the game affected self-sacrificing behavior. We found no effect ($p = .995$) and decided to include all participants in the subsequent analyses.

The main analysis included two predictors (Condition and Round) as well as their interaction term. The dependent variable was the type of choice, operationalized as a binary choice between a self-sacrificing choice (1) and distributing noise (0). In the model, random intercepts were allowed for participants. Hence, our script in lme4 was as follows:

glmer(Choice ~ Condition + Round + Condition*Round + (1 | Subject), family = "binomial")

Results

Descriptive Results

There were 8 women and 8 men in the experimental condition and 9 women and 7 men in the control condition. Of the experimental group, 50% ($n = 8$) believed they were playing online, whereas of the control group 44% ($n = 7$) believed they were playing online. For more information about the distribution of participants' characteristics across the two conditions, see Table 2.

Table 2

Frequencies of Participant Sex, Belief in Online Playing, Language, and Mean Self-sacrificing Choice for the Experimental and Control Groups

	Experimental group (*n*)	Control group (*n*)	Total	%
Participant sex				
Men	8	7	15	47
Women	8	9	17	53
Belief in online				
Positive	8	7	15	47
Negative	8	9	17	53
Language				
Finnish	2	4	6	19
Swedish	14	12	26	81
Mean Self-Sacrificing Choice				
	0.55	0.48		

Note. Self-sacrificing choice = player keeps the noise coin for himself/herself and therefore has to listen to a longer noise. Higher values indicate more self-sacrificing choices. Belief in online Positive = "Believed the game was online", Negative = "could not tell if the game was online or not" and "did not at all believe the game was online".

The Effects of Condition and Round on Self-Sacrificing Choice

We investigated the effect of condition and round and their interaction term on the probability to make a self-sacrificing choice using a binary logistic analysis. To take the clustering of responses within each participant into consideration, we used a multi-level model allowing different intercepts for each individual. We found significant main effects of both predictors (round and condition) and of their interaction term (Table 3).

Table 3

Results from the Multi-Level Binary Logistic Regression

	Estimate	*SE*	*p*-value
Intercept	2.87	0.53	< .001
Round	-0.24	0.03	< .001
Condition	1.62	0.72	.024
Round by Condition	0.13	0.04	.001

Closer scrutiny revealed that for each round the probability to make a self-sacrificing choice decreased. With respect to condition, individuals in the experimental group made, on average, more self-sacrificing choices (55.3%) compared to the control group (48.1%). We also found an interaction effect. This interaction effect showed a steeper decline in the experimental group compared to the control group: The experimental group initially was non-significantly more likely to make a self-sacrificing choice (100%) than the control group (75.0%, χ^2 [1] = 2.57, p > .05). This difference was, however, reversed at the later rounds. At the last round, the experimental group made less self-sacrificing choices (25.0%) compared to the control group (37.5%, χ^2 [1] = 0.15, p > .05; Figure 3).
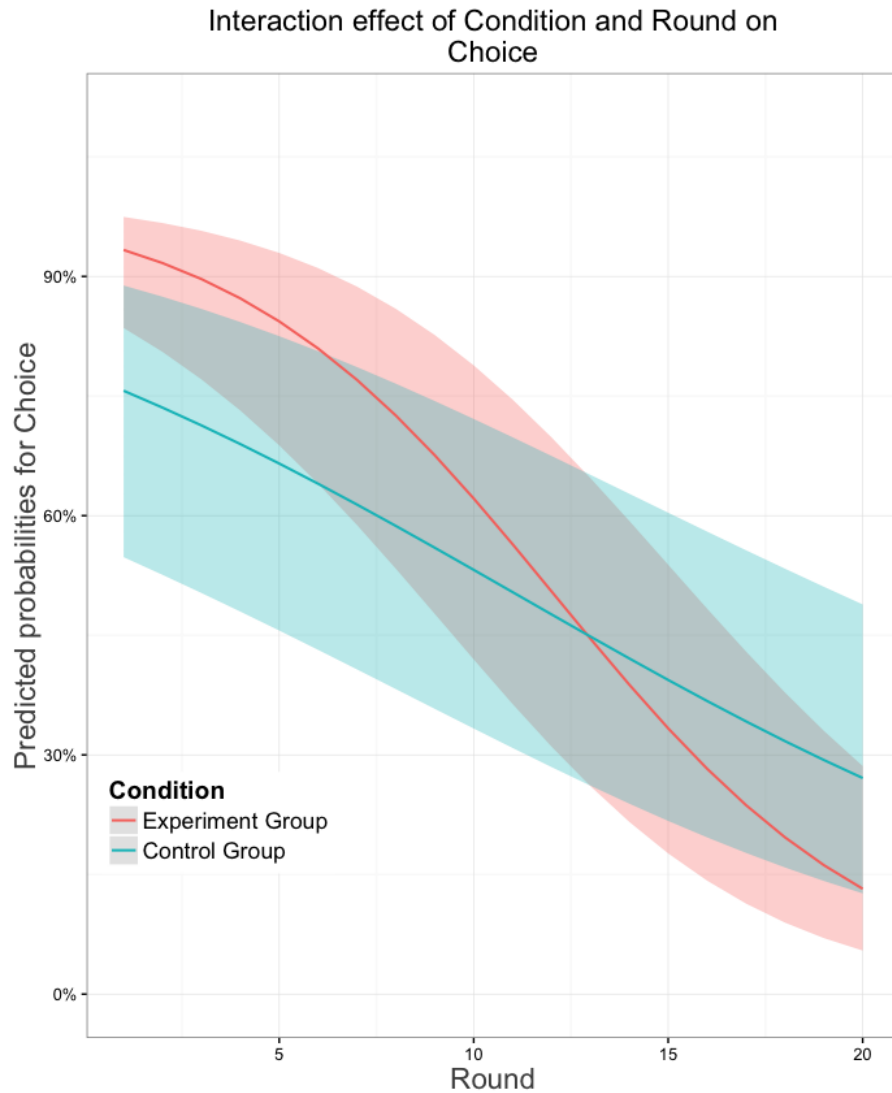
Figure 3. Interaction effect of Condition (Red: experimental group vs. Blue: control group) and Round (1-20; displayed in the X-axis) on the predicted probability of choosing to keep the noise (Choice: self-sacrificing behavior is displayed in the Y-axis). Shadowed areas represent the 95% CI.

Discussion

In the present study, our aim was to investigate whether self-sacrificing behavior towards fictive kin could be induced by manipulating three different kinship cues: phenotypic similarity, association by isolation and linguistic cues. The results of the current study supported our hypothesis: The participants who played against fictive kin played more self-sacrificingly than the participants who played against non-kin. Although the main effect of kinship manipulation was small, the current study is the first to provide experimental support for the notion that a context

of fictive kin can increase self-sacrificing behavior (i.e. increasing self-sacrificing behavior). This is in line with Qirko's theory (2013) of induced altruism.

In addition to finding the main effect of kinship manipulation, an interaction effect was found between kinship manipulation and round. The experimental group was initially more inclined to make a self-sacrificing choice, but this difference was reversed at later rounds.

In both the experimental and control groups there was a decline in self-sacrificing choices through the game, which was expected on the grounds of previous studies (Fischbacher, Gächter, & Fehr, 2000; Ledyard, 1993; Rapoport, 1988).

In the current study, the manipulations included phenotypic similarity (i.e., in facial similarity), linguistic cues of kinship and manipulating association by psychologically isolating the individual from his or her kin with the help of a writing assignment. Since linguistic cues and association have not been previously studied experimentally in a context of a cooperative game, this study can be seen as the first step in this direction. However, because the effect of these aspects were not studied separately, the current study does not provide any evidence regarding the effect of association and linguistic cues *per se*.

The result of this study can also be viewed from a socio-psychological point of view, in which we manipulated aspects of in- and out-groups. Aspects that increase in-group behavior include sex, age, ethnicity or almost any other qualities that are shared within the group (REF). The manipulations of kinship cues employed in the present study could lead to an in-group effect, that is, a positive bias towards favoring in-group members over out-group members. From an evolutionary perspective, however, kin can be considered as the primary in-group, and we do not see these two explanations as mutually exclusive.

Limitations

In the current study, all three kinship variables were manipulated simultaneously. This was done because this study was the first to study the subject of induced self-sacrificing behavior. Considering this we first attempted to maximize the strength of the manipulation. Hence, it is at this point impossible to say how powerful the three manipulations are independently and in relation to each other. More research is therefore needed to distinguish the independent effects. A final concern is the low ecological validity of this study. The low ecological validity

reduces the possibility to apply these findings to real world situations. One final problem to consider, is that the effects are investigated during a very short time frame. In real world situations, groups form and dissolve with over longer periods of time and this likely has an impact on the social behavior members display towards one another. A final limitation to the current study is relatively small sample size used.

Future directions

According to Qirko's theory (2013), organizations requiring costly sacrifices, such as religious, military and terrorist organizations, might benefit from manipulating kinship cues to induce self-sacrificing behavior. The present study supports this hypothesis in the sense that it shows that it is possible to induce self-sacrificing behavior by manipulating these cues. Still, in the future, better ecological validity is needed before any claims regarding real-life situations can be made. We suggest some steps that could increase ecological validity. For example, real people could be used instead of NPCs in a similar game environment, and instead of morphing the pictures, participants could be asked to dress in a certain way. A relatively easy way to study a potential effect of similar uniforms would be to compare choices in a group following a strict dress code with a group without dress code. Such a study could also investigate degree of commitment to the group, the willingness to work for the public good and other interesting outcome variables.

In conclusion, the present study can be seen as one of the first steps in experimentally studying induced self-sacrificing behavior. More ecologically valid research is needed in order to better understand the implications of these effects and their possible applications in real life.

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Introduktion

Enligt Hamilton (1960) definieras en individs fitness av den reproduktiva framgången hos såväl egna som släktingars avkommor. Eftersom det är mer sannolikt att våra släktingar bär på samma allelkopior som vi, till skillnad från personer vi inte är släkt med, kan det tänkas vara lönsamt för oss att investera i släktingars välmående för öka sannolikheten för att våra allelkopior förs vidare till kommande generationer. Både altruistiskt beteende och beteende som har till syfte att inte skada våra släktingar kan gå vidare till/ärvas av våra avkommor. En altruistisk handling kan tänkas vara lönsam för en individ om nyttan för den individ handlingen riktas mot är högre än kostnaden för individen själv. För att kunna rikta altruistiskt beteende mot släktingar är det viktigt att vi på ett reliabelt sätt kan skilja mellan släktingar och personer vi inte är släkt med.

I tidigare forskning har mekanismer som hjälper oss att särskilja mellan släktingar och personer vi inte är släkt med påvisats. Fenotypisk likhet, så som likheter i ansikte, beteende och lukt, är en av dessa mekanismer. Att ha liknande ansiktsdrag har visat sig öka förtroende, samarbete och prosociala handlingar mellan individer (DeBruine, 2002, 2005; DeBruine et al., 2011; Krupp et al., 2008).

En annan mekanism som har erhållit empiriskt stöd är association. Den tid som barn har tillbringat tillsammans med varandra under i barndomen påverkar deras uppfattning om släktskap med varandra. Denna uppfattning om släktskap får individer att undvika att ha sex med varandra och kallas för Westermarck-effekten. Westermark-effekten har även fått vetenskapligt stöd i studier om Israeli kibbutzim samfund och taiwanesiska äktenskap.

En tredje mekanism är användningen av lingvistiska termer som ledtrådar för släktskap, vilket anses vara en relativt modern mekanism eftersom språkförmågan hos människan har utvecklats nyligen, sett ur ett evolutionärt perspektiv. Det har påvisats att om en familj ger sitt adoptivbarn familjens efternamn så underlättas integrering av barnet i familjen. Användandet av termer som hänvisar till släktskap har visats sig väcka mer positiva reaktioner än till exempel termen "vän" (Salmon, 1998).

De ovannämnda mekanismer är dock inte felfria, vilket betyder att de också används i kontext där individerna inte är släkt med varandra. Till exempel upplevs

det äckligt att inbilla sig att ha sex med en nära vän, speciellt bland kvinnor. Att behandla individer som man inte är släkt med som släktingar kallas för fiktivt släktskap. Fiktivt släktskap härstammar från Qirkos teori (2013) om inducerad altruism. Enligt denna teori kan man frambringa altruistiskt beteende genom att manipulera ledtrådar om släktskap. Enligt Qirko (2013) är detta något som används i organisationer som kräver kostsamt uppoffrande av sina medlemmar.

Syftet med denna studie var att experimentellt undersöka om altruistiskt beteende, särskilt självuppoffrande beteende, kunde frambringas genom att manipulera ledtrådar om släktskap. Mer specifikt var våra oberoende variabler lingvistiska termer, fenotypisk likhet och psykologisk isolering från släktingar. Vi förväntade oss att självuppoffrande beteende skulle öka vid närvaro av variablerna lingvistiska termer, fenotypisk likhet och psykologisk isolering från släktingar.

Metod

Deltagarna rekryteras bland studerande vid universitet och yrkeshögskolor i Åbo. De 32 deltagarna delades in i en experimentgrupp och en aktiv kontrollgrupp. Självuppoffrande beteende mättes med hjälp av ett multipel-skott Public Goods-spel. Det ingick 20 ronder i spelet. Deltagaren fick spela med tre fiktiva medspelare. Deltagaren trodde att hen och de tre medspelarna skulle vara uppkopplade när de spelade. I verkligheten var de tre medspelarna förprogrammerade att spela på ett visst sätt. Deltagaren och alla fiktiva medspelare fick ett mynt som representerade oljud som varade en viss tid. Deltagarna fick välja om de behöll myntet själva eller satte den i en gemensam pott i mitten av skärmen. Om de behöll myntet var de tvungna att lyssna på det själva och även lyssna på oljudet från potten. Om de bestämde sig för att sätta det i potten, måste de bara lyssna på oljudet från potten. Potten var uppbyggd så att summan av mynt i potten multiplicerades med 1,3 och efter varje rond distribuerades oljudet till alla deltagare. Deltagarnas råsumma av oljud upphöjdes till 2 för att producera variation och göra det psykofysiskt möjligt att skilja mellan olika tidslängder av oljud.

Mekanismer för släktskapsigenkännande manipulerades. Lingvistiska termer fanns närvarande i form av namn på spelet och en text ovanför bilderna på fiktiva medspelare. I experimentgruppen stod det "syskon" ovanför medspelarnas bilder och namnet på spelet var "Familjespel". I kontrollgruppen stod det "vän" ovanför

medspelarnas bilder och spelet hette "Vänspel". Fenotypisk likhet manipulerades så att det i experimentgruppen morfades bilder så att de liknade deltagaren med proportionen 25:75. I kontrollgruppen var bilderna morfade med en slumpmässig individ med proportionen 25:75. För att psykologiskt isolera deltagarna från sina släktingar bads de i början av testsituationen i experimentgruppen att beskriva ett samarbete med en nära vän. Däremot bads deltagarna i kontrollgruppen att beskriva ett samarbete med ett helsyskon.

Data kodades in så att noll stod för att deltagaren valde att lägga myntet i den gemensamma potten och två stod för att deltagaren valde att att behålla myntet själv. Högre värden står därmed för högre självuppoffrande beteende. Data analyserades med R (R Core Team, 2008) lme4 (Linear Mixed-Effects Models). Signifikansnivå 0,5 användes i alla analyser.

Resultat

I experimentgruppen fanns 8 män och 8 kvinnor. Kontrollgruppen bestod av 9 kvinnor och 7 män. I experimentgruppen trodde 50% (n = 8) på att det spelade uppkopplade medan 44% (n = 7) i kontrollgruppen trodde att de spelade uppkopplade.

För att testa hypotesen om att självuppoffrande beteende skulle vara vanligare i experimentgruppen än i kontrollgruppen analyserades först huvudeffekten av grupptillhörighet. Det fanns en signifikant effekt av grupptillhörighet på självuppoffrande beteende. I enlighet med hypotesen spelade deltagarna som spelade mot fiktiva släktingar på ett mer självuppoffrande sätt (55% självuppoffrande val) än de som spelade mot personer som de inte var släkt med (48% självuppofrande val). Det fanns också en interaktionseffekt mellan grupptillhörighet och runda. I början av spelet spelade deltagarna i experimentgruppen mer självuppoffrande (100%) än deltagarna i kontrollgruppen (75.0%, χ^2 [1] = 2.57, $p > .05$), men skillnaden vändes om vid senare rundor. Vid sista runda gjorde deltagarna i experimentgruppen mindre självuppoffrande val (25%) än deltagarna i kontrollgruppen (37.5%, χ^2 [1] = 0.15, $p > .05$.
Kovariablerna deltagarens kön och tron på att spela uppkopplad inkluderades i analysen. Det fanns ingen signifikant effekt av deltagarens kön på självuppoffrande

beteende. Effekten av tron på att spela uppkopplad på självuppoffrande beteende var också icke-signifikant.

Diskussion

Syftet med denna studie var att utforska om självuppoffrande beteende kunde frambringas genom att manipulera ledtrådar om släktskap: fenotypisk likhet, association via psykologisk isolering och lingvistiska termer. Resultaten stöder hypotesen om att närvaro av ledtrådar om slätkskap ökar självuppoffrande beteende: Deltagarna som spelade mot fiktiva släktingar betedde sig mer självuppoffrande än de som spelade mot icke-släktingar.

Effekten av tron på att spela uppkopplad på självuppoffrande beteende var icke-signifikant. Effekten av deltagarens kön på självuppoffrande beteende var också icke-signifikant. Huvudeffekten av grupptillhörighet var signifikant, dvs. deltagarna i experimentgruppen spelade mer självuppoffrande än deltagarna i kontrollgruppen. Dessutom hittades det en interaktionseffekt mellan grupptillhörighet och runda. I experimentgruppen började deltagarna spela mer självuppoffrande än deltagarna i kontrollgruppen. I slutet spelade deltagarna i experimentgruppen mindre självuppoffrande än deltagarna i kontrollgruppen. Resultaten kan också betraktas ur ett sociopsykologiskt perspektiv. I denna studie kunde de fiktiva medspelarna tänkas vara representanter för deltagarens ingrupp. Indelning i ingrupp versus utgrupp kan innefatta kön, ålder, etnicitet eller övriga egenskaper som man har gemensamt i ingruppen. De ledtrådar om släktskap som manipulerades i denna studie kan tänkas fungera på ett motsvarande sätt som kategoriserande variabler. Inom socialpsykologin är det allmänt känt att det finns en positiv bias mot ingrupp i form av favorisering av den till skillnad från utgrupp. Det syns till exempel på så sätt att man hellre delar ut belöningar till ingrupp än till utgrupp och att man hellre delar ut bestraffningar till utgrupp än till ingrupp (Tajfel, Billig, Bundy, & Flament, 1971). Detta är i enlighet med resultaten från denna studie: I experimentgruppen där det fanns fler ledtrådar om ingrupp betedde deltagarna sig mer självuppoffrande än deltagarna i kontrollgruppen där ledtrådar om ingrupp var färre och kontrasten mellan egen familj och medspelarna var mer framträdande. Från ett evolutionärt perspektiv skulle det vara meningsfullt att betrakta ens släktingar som den primära ingruppen men att den också kan inkludera andra.

Begränsningar

Alla tre ledtrådar om släktskap användes främst för att denna studie var den första studie som handlade om inducerad altruism i en situation som inte ledde till egen vinst. Om det fanns en effekt, skulle vi högst sannolikt få fram den genom att ha alla variablerna närvarande. För det andra är det omöjligt i det här läget att säga hur kraftiga manipulationerna är i relation till varandra. Mer forskning behövs innan reliabla slutsatser kan dras om vilken av dessa variabler som kunde tänkas vara den viktigaste i inducering av självuppoffrande beteende, och om prioriteringsordningen varierar mellan individer och olika kontext. Allra mest begränsar studiens ekologiska validitet möjlighet till tillämpning i det verkliga livet så som i Qirkos teori (2013). Problem med den ekologiska validiteten innefattar den korta tiden under vilken studien har genomförts. Sampelstorleken i denna studie var också relativt liten.

Framtida inriktningar

Som nämnts tidigare, enligt Qirkos teori (2013) kräver organisationer kostsamma uppoffringar av sina medlemmar, så som religiösa, militära organisationer och terroristorganisationer manipulerar ledtrådar om släktskap för att inducera altruism. Denna studie ger stöd åt föreställningen att det är möjligt att inducera altruism genom att manipulera ledtrådar om slätkskap. Däremot begränsar både den ekologiska validiteten och sampelstorleken möjligheten att generalisera resultaten till situationer i det verkliga livet så som Qirko föreslår i sin teori (2013) där också andra faktorer, kulturella och miljöspecifika inverkar.

För att förbättra den ekologiska validiteten skulle man i framtida forskning kunna använda riktiga medspelare. I stället för att morfa deltagarnas bilder kunde dessa bes att klä sig på ett visst sätt. Ett relativt lätt sätt att studera fenotypisk likhet och effekten av uniform skulle vara att jämföra skolor med klädkod med skolor utan klädkod och jämföra studerandes förpliktelse och villighet att jobba för det gemensamma bästa.

Sammanfattningsvis kan denna studie betraktas som ett av de första stegen i experimentell forskning om inducerat självuppoffrande beteende. Mer ekologiskt valid forskning behövs för att ta reda på omfattningen av dessa effekter och möjliga tillämpningar av dessa i det verkliga livet.

PRESSMEDDELANDE

Pro gradu-avhandling i psykologi
Fakulteten för humaniora, psykologi och teologi

Studie visar att sannolikheten till självuppoffrande beteende kan ökas experimentellt.
   I en studie vid ämnet psykologi i Åbo har man funnit att sannolikheten att själv utsätta sig för en jobbig situation (lyssna på ett högt ljud) istället för att låta andra tvingas lyssna på detta ljud kan ökas experimentellt. I studien, som utfördes i spelmiljö, manipulerades motspelarnas och spelets karaktär. I en betingelse kallades spelet för familjespel och motspelarna liknade försökspersonerna. I den andra betingelsen kallades spelet för vänspelet och motspelarna liknade inte försökspersonerna. I "familjespelet" var försökspersonerna mer benägna att utsätta sig själv för det jobbiga ljudet.
   Forskarna menar att studien funnit stöd för att altruistiskt beteeende kan ökas genom att manipulera sk. ledtrådar om släktskap. Exponering för mer ledtrådar om släktskap var associerat med en högre nivå av altruistiskt beteende. Ledtrådar som användes i studien var ansiktslikhet, lingvistiska ledtrådar som ordet "syskon" och psykologisk isolering från primärfamiljen. Studien urfördes i form av ett dataspel. Deltagarna i studien var studerande. Altruistiskt beteende mättes som självuppoffrande beteende, närmare som beredskap att lyssna på ett oljud istället för att låta andra göra det.

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