



**NEW BULGARIAN UNIVERSITY**

**DEPARTMENT OF COGNITIVE SCIENCE AND  
PSYCHOLOGY**



**DECISION-MAKING UNDER NEGATIVE AFFECT AND THE  
THREAT OF BEING OUT OF A GROUP**

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## Abstract

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In several experiments we wanted to explore the different aspects of the experience of Ostracism (Williams, 2007) and the behavior of the victims of social exclusion in a decision-making game. We had a main hypothesis that the ostracism will instigate people towards cooperation. In all four studies we compared the treatment groups of included and excluded and we could not find statistical difference. In the first experiment, we used a manipulation called Cyberball (Williams et al., 2006), with two conditions: exclusion vs. inclusion, after which we measured the rate of cooperation of the players in an iterated Prisoner's dilemma game (IDG). We also measured the Action-control tendencies (measured by ACS-90, Kuhl, 1994) as a possible moderator for the effect of negative mood after exclusion. In the second experiment we manipulated the exclusion inside the repeated version of PDG with the option to choose a partner for the games. In the third experiment, we added a translated from English questionnaire to see how the experience of Ostracism is linked to different fundamental human needs. The fourth experiment, investigated the differences between the effects of Ostracism and those of the negative mood. In this continuous work we wanted to clear out the contradictions found in previous works and to find a good experimental method for manipulating exclusion in laboratory conditions. We gathered data suggesting that the cooperation correlated with certain scales of the Ostracism questionnaire and with mood. The general tendency in our experiments was that the participants in negative mood cooperated more than those in positive. Moreover, in the fourth experiment, the people in social negative mood cooperated more than the participants in individual negative mood. The manipulation was conditioned by mood stories that varied in valence (positive, negative, neutral) and the types of the story (social vs. negative). Taken together, our experiments describe a model in which to make a decision of cooperation is not solely predicted by the negative mood but by a socially experienced negative state. In the experiment, we used innovative manipulations that can be implemented in a subsequent work on the behavior in social interactions.

The thesis was submitted in English, containing:

- Main text (143 pages)
- 195 references (19 pages)
- 20 Tables (13 Tables in the Main text and 7 Tables in the Appendices)
- 23 Figures
- 4 Appendices, showing used questionnaires and mean tables (15 pages)

Tables and Figures included in this extended abstract are numbered as they are found in the thesis.

## Table of Contents

Structure and Overview of the Thesis .....	5
1. Evolution of the Term Social Ostracism. Individual Differences in Dealing with Social Threat .....	6
2. Contemporary Theories on Decision-making .....	8
3. Experiments.....	10
Experiment 1 .....	12
Experiment 2 .....	20
Experiment 3 .....	28
Experiment 4 .....	33
<i>Pretest of Mood induction stories: Can an exclusion story induce experience of Ostracism?</i> .....	34
<i>Main Part</i> .....	39
4. Summary and Discussion .....	45
<i>Did the Ostracism Lead to Cooperation?</i> .....	45
<i>Did the Negative Mood Predict Cooperation?</i> .....	45
<i>Did the Construct of Action-orientation Relate to Coping with Negative Mood and Ostracism?</i> .....	47
<i>Difficulties in the Experimental Studies of Ostracism</i> .....	48
<i>Did We Measure the Impact of Ostracism or of any Social experience?</i> .....	49
5. Summary of Contributions .....	50
Author`s Publications .....	52
References .....	53

## Structure and Overview of the Thesis

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Chapter 1 provides a theoretical wording of the problem. We discuss the need to belong as a fundamental basis for every social being. The chapter also relates to the term's origin, history and different forms of Ostracism. Additionally we introduce the problem of individual differences in coping with the pressure of the threat to be left out of a group.

Chapter 2 presents theories and previous empirical data on Decision- making and Emotions. It dicusses Game theory and Prisoner`s Dilemma gama as a method to study social interactions.

Chapter 3 is dedicated to the empirical studies that we did on the topic of Ostracism and the cooperation tendencies with the help of a repeated Prisoner`s dilemma game.

Chapter 4 concerns summary and discussion on the results of our empirical experiments.

Chapter 5 contains the summary of contributions of the PhD candidate.

In the end are the list of references, Appendices A to D that included all tables, graphs and materials from our four experiments.

Tables and Figures included in this extended abstract are numbered as they are found in the thesis.

## 1. Evolution of the Term Social Ostracism. Individual Differences in Dealing with Social Threat

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Ostracism as a term is derived from Greek history. The concept is borrowed from Athenian democracy which is characterized as extremely stable. In the Greek constitution existed the term "ostrakismos" from 500 BC, which was a guarantee of stability (Forsdyke, 2005). Every winter, the citizens of Athens Collective decided by casting votes (written on pieces of pottery "ostraca") to expel or not from society the people who have tried to become too powerful or rich. If one got 6000 votes or more, he was banished for a small period or for 10 years. Interestingly, in many years Athenian citizens did not exercise their power to send people to exile, which may suggest that the mere threat of ostracism was sufficient to deter people from greedy behavior (Ouwerkerk, J. , Kerr, N. L., Gallucci, M., Van Lange, P., 2005).

Ostracism, defined here as exclusion or abandonment by a group, in real life can occur when individuals are ignored, and yet remain in the presence of others. Informal ostracism can be found in classrooms, playgrounds, business offices, war and religious institutions, as well as modern online chat rooms (Williams, 2007). The term "social exclusion" and the term "rejection" in the literature are often used to describe any situation that threatens the need to belong (Baumeister & Leary, 1995), including a threat which is clearly and directly communicated (e.g., Buckley et al., 2004) and one that is passive and indirect, but leaving an unpleasant feeling in the individual (e.g., Twenge et al., 2003, Molden, D., Lucas, G., Gardner, W., Knowles, M., Dean, K., 2009). Other authors use the term "rejection" only for cases which concern clearly stated exclusion or isolation. People who are rejected suffer from social loss, leading to focus on avoidance of the social contacts. The ignored (excluded people) suffer from a failure to reach social goals, and focus on construction of new connections. The ostracism experience increases also the social sensitivity (Gardner, Pickett, & Brewer, 2000; Gardner, Pickett, Jeffries, & Knowles, 2005; Maner, DeWall, Baumeister, & Schaller, 2007; Williams, Cheung, & Choi, 2000). The results of social exclusion include lowering of self-esteem, increased aggressiveness and increased subordination of group norms (Leary et al., 1995).

Ontologically, the Ostracism should trigger intertwined sets of internal processes as cognitive information processing and the self-regulation that should enable one to sacrifice his/her selfish tendencies in the name of providing and maintaining acceptance in the group.

In order to cope with life and not to be alone, one person should be adaptive to change him/herself to fit with the group.

Classical studies on group norms provide little support for the role that personality traits play in moderating the influence of the group. In relation to conformism, the personal characteristics that are discussed are associated with the motivation of people to comply (Monin et al., 2008). For example, low self-esteem is associated with motivation to obey because of fear of rejection, while authoritarian individuals supposedly are motivated to obey because of their alleged need for order and discipline.

In 1994, Beckman decided to test Ash paradigm that relates to conformism with personality tool that is called Action control scale (ACS-90), which divides people into aimed toward action (action- oriented) and aimed toward state (state-oriented). The orientation that this tool explores, people develop from early age and deepen over the years on unconscious level. Beckmann suggests that the state-oriented individuals after the Asch task will exhibit higher conformism than the action-oriented. He proved his hypothesis in two studies. His data show that the results of the Ash experiment (1956) are valid only for the state- orientated participants. Action-oriented individuals did not confirm with the norm. The instrument that measures the construct- ACS-90 has three subscales: AOD (Action orientation under demand – scale connected to the search of a decision, those who are high on the scale are action-oriented, while those who are low- have difficulties in decision-making), AOF (the action orientation after failure is linked to inclination towards action after period of failure versus the state-oriented are not able to act). <sup>1</sup>The mechanisms that recognize that ACS-90 relate also to self-regulation and are activated in response to threat (Koole, 2004). State-oriented individuals are more volatile and have difficulties to take action to fulfill their intentions; they are more likely of being "infiltrated" with foreign intentions that they feel as self-selected. Kazan and Kuhl (2005) suggest that this is especially true in the case of low-attractive goals when state- oriented people are experiencing "infiltration" because they lack positive valence, which is necessary to integrate these objectives into separate personality system.

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<sup>1</sup> The third scale AOP (resistance vs. instability) was not included in our experiments. The scale measures the trends when dealing with internal conflict.

## 2. Contemporary Theories on Decision-making

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Many authors are fascinated by the topic of Decision-making. Cognitive science researchers highlighted the role of information processing, reasoning, and modeling algorithms for logical inference that are for example necessary to retrieve relevant knowledge from memory. The Theory of rational choice uses mathematical models to describe decision-making in the field of economics, political science and related disciplines in which the "rationality" is maximization (Archibald et al., 1963). In such rational theory to make a decision is to find the optimal choice in the frame of the available information.

The Game theory describes idealized social interactions that involve two or more people. The method that the Game theory uses is the game as most direct and easy way to explore the processes of decision-making in case of social dilemmas. It is used to study mathematically the conflicts and the cooperation tendencies between intelligent rational beings (Rasmusen, 2001). The dilemmas are strategic games where the understanding of all possible outcomes is easily accessible for the player, unlike games of chance where the outcome may be determined in whole or in part by some randomized factor. When a decision-maker has 2 or more than two choices of moves, each player has a preference for a move. The theory explores the decision-making processes by predicting the behavior of a player in situations where he/she should use strategies to get the maximum of the expected "utility", to maximize her/his profits.

The Prisoner's dilemma game presents a situation of two prisoners held in separate rooms, who are faced with the options to convey their comrade in exchange for a lower sentence or to withheld the true and to endure minimal time for their crimes. According to the classic rules of the Prisoner's dilemma game (PDG), the results strictly follow a matrix of return, where the player gets the most points as a result of non-cooperating against a cooperating player; at least - when cooperating against noncooperating player; the two players have mutual benefit when both cooperate and mutually low outcome when both avoid cooperation. The rational player when takes into account the choice of the other player should choose to betray instead to serve a sentence in years (Workman, 2005). However, if any rational player takes into account the game in perspective, when the game is repeated and creates a history of interactions, the long-lasting model of cooperation can be established without interference from additional motivator. In "iterated" prisoner's dilemma (IPD) the same pair of players make their decisions several times in a row. This allows the player to

remember previous choices of the person with whom he/she plays. In such cases, compared to the conditions of classical Prisoner's dilemma wherein the matrix is constructed so that the best choice is the defection, the choice of co-operation in the IPD is converted over time to be most successful strategy. The results of a Prisoner`s dilemma tournament show that "reciprocal cooperation, once occurred, could spread in the population where initially non-cooperative strategies were prevailed "(Axelrod, 1984).

As the social science advances, the Social Exchange Theory arises derived from Economic Theory. Thibaut and Kelley (1959) made modifications to study social psychology of the group, focusing on the calculation of relative costs and profits in social relationships. The outcome of modeling according to this theory is ultimately the satisfaction of the relationship. Comparison is a key element of social exchange and provides the standard against which all other relationships are assessed. Comparative standards are subjective and vary among individuals and groups (Ward & Berno, 2011). The Social Exchange Theory involves both interconnectedness and a shared commitment in which both parties perceive responsibilities to one another (Thibaut, & Kelley, 1959).

In the same line as the Social Exchange Theory, the Interdependence theory (Rusbult & Van Lange, 2003) deals with relationships between people in the form of social exchanges where the price is paid through emotions and depends on whether or not the interaction is enjoyable. According to this theory, people mentally calculate what they receive and what they give to define the relationship as positive or negative. This and other social theories perceive people as social beings looking for relationships in the hope of bringing them pleasant emotions. In line with this rationale, we have formulated the current research questions: what is willing to give up to fit into the social group and how to make decisions if it is threatened by dropping out of a group.

### 3. Experiments

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#### **Rationale for Current Work**

Different strategies that people use in face of a danger of falling out of a group are: a desire for revenge, increasing anger and hostility towards people who are guilty for hurting your feelings; aggression towards people in general (Buckley, Winkel, & Leary, 2004; Twenge, Baumeister, Tice, & Stucke, 2001; Leary, Twenge, & Quinlivan, 2006); withdrawal from social contact and escape from self-esteem (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007; Twenge, Catanese, & Baumeister, 2003). On opposite are the studies on Ostracism that report increasing tendency towards ingratiation (Williams, Cheung, and Choi, 2000; Gardner, Pickett, Brewer, 2000), thwarting to behave pro-socially, cooperative and helping (Twenge, Ciarocco, Cuervo, & Baumeister, 2003). Moreover, Carter- Sowell, Chenn, & Williams (2008), show that the threat of social exclusion increases compliance to a request for monetary donation.

Comparing the effects of Ostracism and simple emotions, there are three plausible directions that could explain how social exclusion can affect cognitive processing. First, social exclusion can cause agitation, with a corresponding narrowing of attention and focus on the certain responses similar to the effect of strong emotions. Second, the Ostracism can cause people to think about the reasons why they are rejected, hindering them from processing new information. Third, the excluded people can spend much of their cognitive resources to suppress their emotional distress and that would overwhelm their attention and executive function. Thus, Ostracism violated self-regulation processes, along with other controlled processes, while automated processes remain relatively untouched (DeWall, Baumeister, and Vohs, 2008). Roy F. Baumeister & C. Nathan DeWall (2005) suggest that not the very emotion, but the impaired self and intelligent thought is the cause of the maladaptive decisions that the rejected people make. According to the authors, as a result of rejection the executive function of the personality may suspend its normal functions. And when the self-regulation is disturbed, this leads to impulsive and selfish behaviors. According to the researchers, active reactions in such situations are reduced and more passive reactions are to happen. Thus, defects are occurring in complex thought processes involving controlled responses, while automatic responses and habits may continue as usual (and may even overrule). Baumeister, Twenge, & Nuss (2002) conducted experiment to test whether social exclusion have any negative effect on intellectual functioning. Their experiment showed that

social exclusion worsen cognitive processes that required active logical thinking, but left most other automatic activities (as memorizing) unaffected. Interesting finding is that, a test for mediation showed that the results were not due to emotional stress. It could be suggested that emotions should interact with motivation, because they are an integral part of the motivational regulation. The need itself "does not know" what can be granted, and "cold" knowledge is indifferent to the needs of the body. However, none of the mood mediation tests was significant. The authors suggested that the affective-cognitive structure has been already established, and the emotions were too much intermingled to be discerned from the process.

Our research was inspired by the paradigm of Cyberball (Williams, 2006), which tests the "ostracism" in modern times. The cybergame is a social interaction inside a computer network. We decided to measure the cooperation after exclusion in a repeated PDG. A similar study has been done before but with opposite results. Twenge, Ciarocco, Cuervo, and Baumeister (2003) manipulated social exclusion and gave participants the opportunity to act prosocially. The excluded participants in Twenge, Ciarocco, Curvo and Baumeister`s study donated less money to a student fund. Furthermore, they were less likely to volunteer for additional experiments to help graduate students, and were less helpful when the experimenter dropped pencils on the floor. In the study of Twenge et al. (2003), the excluded participants were consistently less prosocial, even when prosocial behavior would have benefited themselves (as in the Prisoner's Dilemma game).

A separate line of reasoning is that the negative emotions aroused by isolation are influencing the people to act rather impulsively. And it was of our interest to verify whether the negative emotion influenced the behavior or in contradictory, the mere "ostracism" can be a powerful tool for promoting cooperation in groups (Hirshleifer & Rasmusen, 1989).

The aim of our experiments was to see if a man caught in a dilemma situation under negative experience would undertake the risky investment in trust (Blomqvist, 1997) contributing with an attitude of cooperation to the other player in a group, neglecting the possibility of short-term profit. And beyond this ambition, in the experiments we tried to investigate the role of self- regulation in dealing with social pain by concentrating on the nature of the relationship between feelings of rejection, mood and personality differences in self-regulating.

## **Experiment 1**

### ***Goals & Hypotheses***

In our studies, we tested the following common hypothesis:

Hypothesis (H1): In the presence of a threat of an exclusion from a group, the individual will tend to cooperate. The tendency towards cooperation in the Prisoner's dilemma game should be considerably weaker among the individuals who are in the controlled group and presumably should follow the fundamental rule of the experimental Prisoner's dilemma game to compete for the most points by defecting.

Additional hypotheses we wanted to investigate were:

H2: Mood would drop after the ostracism event (inside the group with manipulation of Ostracism).

H3: Action - orientation as a personal characteristic might interact with mood leading action- oriented participants to cooperate more.

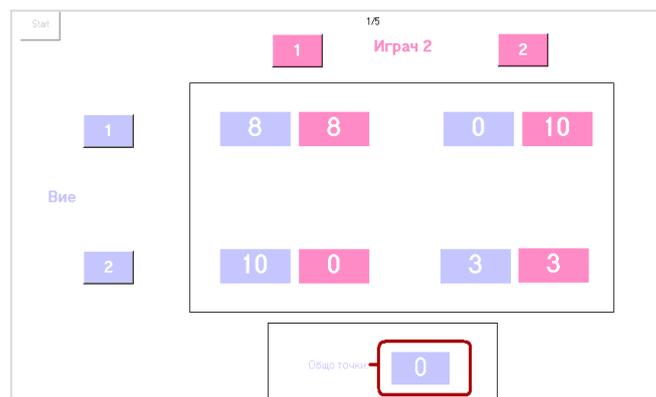
### ***Method***

In the first experiment we used a method inflicting Ostracism that has been tested as a valid manipulation. This was the game Cyberball, in which the avatars of the participants threw a virtual ball between each other. The tool was produced by Blair Jarvis from the company Empirisoft and created by Christopher Cheung and Wilma Choi (Williams, Cheung, & Choi, 2000), as part of their thesis under the direction of prof. Kipling Williams. The computer game has several versions and in our experiment the participants were divided into two of these conditions. Namely, in one of the conditions each participant played with two fake players that throw equal number of times to the other "players" in the game (control group, included). In the other condition the subjects received the ball only at the beginning of the game and never after (ostracism, excluded group). The participants in the experiment were recruited in groups and thought they were playing against the other subjects of the experiment.



**Figure 2:** *Illustration of the Cyber ballgame interface used in Experiment 1. The subject was visualized by the hand in the middle bottom part of the screen.*

After the Cyberball, the respondents went through Iterated computer version of the Prisoner's dilemma, which was built on Matlab platform and consisted of 50 one-shot games. The respondents were informed that the computer will allocate them to play a dilemma with one of the players that have played previously in the Cyberball game. In fact, they were playing against a computer strategy that repeated their own moves three games before. We also measured the mood just before and after the game via the questionnaire BEF4-R (the shortened version of several mood scales (Kuhl & Kazén, 1994). The personality characteristics action/state orientation was measured by ACS-90 (Kuhl, 1994)<sup>2</sup>.



**Figure 3:** *Matrix of choices in the Prisoner's dilemma game on a Matlab platform (Experiment 1)*

*Design.* Dependent variable (DV) – the level of cooperativeness in PDG estimated as the number of choices of C (cooperation) vs. D (defection) from all possible 50 one-shot games in the Iterated Prisoner`s Dilemma Game. Independent variable (IV) - the manipulation group with two levels (i.e. ostracism vs. inclusion) was used as a between-subject factor. The Ostracism condition was induced with a situation where the player participate in the Cyberball game as receiving and throwing the ball only in the beginning of the game and then left out of the group, without the chance to receive and throw back the ball to the two other “fake” players till the end of the game. In comparison, the Inclusion (control) condition the

<sup>2</sup> The translated ACS-90 can be found under Appendix A2.

participants received equal amount of times like the other (“fake”) player during the whole Iterated Prisoner`s Dilemma Game.

*Procedure.* In the first experiment we used Cyberball and the Prisoner's dilemma as two separate games. We started the experiment with a questionnaire composed of 24 questions in which the respondents had to choose between two alternatives that they feel were more likely to happen to them. In the instructions was noted that it was important to respond spontaneously with only one of the two alternatives and if it was difficult to choose, to think about how did they tend to behave in the majority of similar cases. After the personal questionnaire, the respondents were given a mood questionnaire in which they had to answer how they felt at the moment without hesitating on a scale from 1 to 4. The questionnaire is called BEF-4R (Kuhl, J. & Kazén, 1994) and is a modified version of a few panels that measure mood and feelings of joy, peace, helplessness, action, tension, fatigue and anger, we used it in the beginning of the experiment, before and after the dilemma game. The next step of the experiment was the Cyberball game. The subjects were told that the experiment aimed at studying the ability of the mind to visualize in imaginary games. For this task the respondents must use their abilities to submerge in an imaginary game. We instructed them that they would play a game where the players virtually pass a ball in a group with two other random participants from the experiment. According to the instructions the game rules were simple: "When you pass the ball, use the mouse and click on your chosen player you'd like to play with. What is important for the implementation of this experiment is not so much to pass the ball, but your ability to imagine that you are involved in the game. Imagine for example how other players look like? What kind of people are they? Where is the game? Are you warm or cold during the game? We ask you to imagine a full picture of what is happening in the game and what will happen if you play this game in reality". When the game ended, the participants had to wait for instructions on how to continue the experiment. After the virtual ballgame they received the mood questionnaire for the second time, and then they were involved in a Prisoner's dilemma game. The last questions were related to the tasks that were already executed. We asked the participants to tell their sincere opinion, because their answers will help us to improve the experiment. With the feedback questions we wanted to explore the contradictions found in previous studies on how people react and how they feel during the manipulation, were they aware of any manipulation.

*Participants.* The experiment was attended by 36 participants in the laboratory of New Bulgarian University. Full data analysis was performed on the data from 34 people (2 persons were excluded because of missing data). The sample was distributed evenly: 17 Men: 17 women; 17 in the ostracized group and 17 people in the included group.

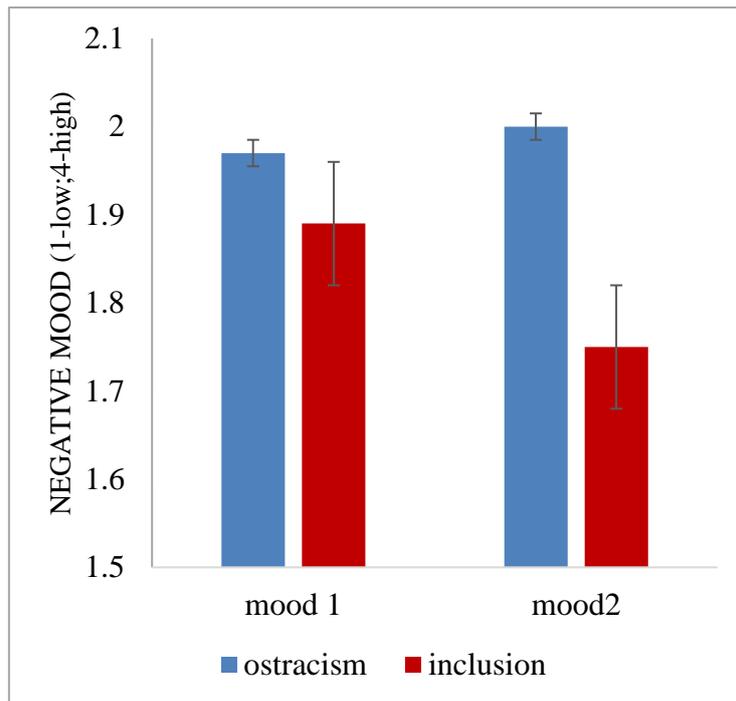
### **Results**

*Cooperation.* The cooperation index in the Prisoner's dilemma game ranged from 0 to 0.98 ( $M = 0,47, SD = 0,22$ ). Overall the women in the group cooperated more than the men ( $r = -,522, p < .01$ ). The average cooperation in ostracism group ( $M = .48, SD = .26$ ) did not differ significant from the average cooperation in the inclusion group ( $M = .45, SD = .19$ ),  $t(32) = .445, p > .05$ . And again, we had insufficient evidence to reject the null hypothesis of equal means at the 0.05 level (95% confidence interval). Cohen's effect size value ( $d = .13$ ) suggested a low practical significance.

*Mood.* The questionnaire that I translated- BEF-4R<sup>3</sup>- was composed of 23 questions about the mood of the participants. The questions formed five subscales that assess the feelings of joy, calmness, helplessness, activity, tension, listlessness, and anger. Respective Cronbach's alphas for these scales were .87, .12, .70, .67, .70, .83, .73- during the first assessment; and .93, .28, .85, .82, .85, .82, .87- during the second assessment. Sadness, peace and fear were measured as additional autonomy items. The negative mood scores after the manipulation ranged from 1.3 to 3.0 (Mean = 1.87, Median = 1.78,  $SD = 0.45$ ), where 3 was a high negative mood (ranged from 1 to 4, where 1 corresponds to "not at all" and 4 – to: "a lot"). We performed a t-test to see whether there was a difference in the mood between the two groups in the declarative measurements of the mood after the manipulation. There was a marginal significance of the negative mood after differences between the two groups in accordance with the manipulation ( $t(32) = 1.925, p = .063$ ). In the group of ostracized the negative mood was higher ( $M = 1.99, SD = 0.55$ ) than in the included (control group,  $M = 1.75, SD = 0.30$ ). Cohen's effect size value ( $d = .5$ ) suggested a moderate effect size.

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<sup>3</sup> The translated Mood questionnaire can be found under Appendix A1.



**Figure 4.** Means of negative mood before and after the manipulation in ostracized and control Group. The means of the variables are inserted inside the columns (Experiment1)

*Mood and Cooperation.* To check whether not the group manipulation but the mood and especially the specific subscale of mood Joy was related to the cooperation, we did separate regression analyses with IV the overall negative mood and the ratings of joy subscale after manipulation and DV- cooperation rate. The results of the regression with the average negative mood did not reach statistical significance ( $R$  square = .64,  $F(1, 32) = 2.198$ ,  $p = .148$ ). The results of the second regression test with the subjective ratings of Joy after the manipulation indicated the rating on the Joy subscale explained 13% of the variance ( $R$  square = .13,  $F(1, 32) = 4.796$ ,  $p = .036$ ). Joy significantly predicted cooperation tendencies ( $\beta = -.361$ ,  $p < .05$ ).

*Individual orientation toward state or action.* The other set of analysis was done to check whether there were some personality tendencies towards cooperation, measured by the construct Action-orientation (Kuhl, 1994), presuming that the individual's ability to self-regulate upon threat will interact with the group manipulation. Our third hypothesis (H3) for the experiment was that only people who were able to self-regulate negative affect (action-oriented) could cooperate after exclusion. The scale ACS reached an internal consistency (Cronbach's alpha) of = 0.822 ( $M = 36$ ,  $SD = 4.92$ ). The internal correlation of two constructs we used of ACS-90 was as follows: AOF reached Cronbach's Alpha = 0,673. The internal

correlation of AOD reached Cronbach's Alpha = 0,810. According to the norms (Kuhl, 1994) participants were classified as action-oriented if the sum of their responses exceeded the average rate of 35. 20 people from the experiment turned out to be in the group of state-oriented and 14 people action-oriented.

*Hypothesis 3.* To assess the pattern that is between multiple dependent variables, instead the model of influencing a single dependent variable, we decided to use a test with greater statistical power in case that the dependent variables are correlated. In our data we used the F Simple effects procedures to maintain the essential structure or nature of the interaction effect. This method breaks the interaction effect into parts and investigates the distinct parts for significance. With syntax language in SPSS which invokes “MANOVA” we tried to identify effects that are smaller than those that regular ANOVA can find.

**Table 4.** *Analyse of variance with 3 designs. Included variables: Cooperation, Mood after manipulation and Action/State orientation (sample of 34 participants, Experiment 1)*

4.1. Means and Standard Deviations, variable Cooperation.

Levels of Factor 1	Levels Factor 2	Mean	SD	N	95% CI	
					Lower	Upper
Low negative mood after the manipulation	State oriented	.471	.244	9	.283	.659
	Action oriented	.382	.244	11	.218	.546
High negative mood after the manipulation	State oriented	.491	.142	11	.395	.586
	Action oriented	.673	.244	3	.066	1.280
For entire sample		.466	.221	34	.389	.543

*Note:* The levels of the variable of negative mood is calculated by dividing through medium split into Low and High negative mood. The levels of the variable Action Control is divided by medium split in Action (above the medium split) and State orientation (below the medium split).

4.2. Analyse of variance. Test for significance for Cooperation using unique sums of squares (Design 1)

Source of Variation	Sum of Squares	df	Mean of Squares	F	Sig of F
Within+Residual	1.39	30	.05		
Negative mood after the manipulation	.15	1	.15	3.33	.078
Action Control	.01	1	.01	.30	.589
Negative mood x Action Control	.12	1	.12	2.54	.122
(Model)	.21	3	.07	1.54	.226
(Total)	1.61	33	.05		

*Note:* The levels of the variable of negative mood is calculated by dividing through medium split into Low and High negative mood. The levels of the variable Action Control is divided by medium split in Action (above the medium split) and State orientation (below the medium split).

R- Squared = .133. Adjusted R-Squared = .046

4.3. Analyse of variance. Test for significance for Cooperation using unique sums of squares (Design 2)

Source of Variation	Sum of Squares	df	Mean of Squares	F	Sig of F
Within+Residual	1.39	30	.05		
Negative mood after the manipulation	.15	1	.15	3.33	.078
Action Control Within Low Negative Mood	.04	1	.04	.85	.364
Action Control Within High	.08	1	.08	1.69	.204

Negative Mood					
(Model)	.21	3	.07	1.54	.226
(Total)	1.61	33	05		

*Note:* The levels of the variable of negative mood is calculated by dividing through medium split into Low and High negative mood. The levels of the variable Action Control is divided by medium split in Action (above the medium split) and State orientation (below the medium split).

R- Squared = .133. Adjusted R-Squared = .046

4.4. Analyse of variance. Test for significance for Cooperation using unique sums of squares (Design 3)

Source of Variation	Sum of Squares	df	Mean of Squares	F	Sig of F
Within+Residual	1.39	30	.05		
Action Control	.01	1	.01	.30	.589
Negative Mood Within State Orientation	.00	1	.00	.04	.839
Negative Mood Within Action Orientation	.20	1	.20	4.31	.047*
(Model)	.21	3	.07	1.54	.226
(Total)	1.61	33	05		

*Note:* The levels of the variable of negative mood is calculated by dividing through medium split into Low and High negative mood. The levels of the variable Action Control is divided by medium split in Action (above the medium split) and State orientation (below the medium split).

R- Squared = .133. Adjusted R-Squared = .046, \* $p < .05$ .

From our test designs in MANOVA is visible that the significant difference appear in the Negative mood group within the Action control people.

In order to describe better the specific relations between the mood scales, personality differences, and ostracism, we are also reporting the correlations between the mood scales and the personality differences.

*Action orientation and Mood.* We decided to see if there were any intragroup differences regarding the mood of the individuals depending on their orientation towards action or state. The state-oriented were more in a negative mood in compare to action-oriented after the manipulation ( $M(\text{state-oriented}) = 1.55$ ,  $SD = .510$  vs.  $M(\text{action-oriented individuals}) = 1.21$ ,  $SD = .410$ ,  $(t(32) = 2.016$ ,  $p < .05$ , 95% CI  $[-.00347, .67490]$ ). Looking into the separate mood scales, the Action- orientation correlated negatively with the subscale Helplessness ( $r = -.395$ ,  $p = .021$ ) positively with Joy ( $r(32) = .337$ ,  $p = .05$ ).

### ***Summary: Experiment 1***

In the first experiment, we did not find a significant difference in the two experimental groups (those who received the ball equal number of times as the other players compared to those who received the ball only at the beginning of the game) measured by their cooperation in the Prisoner`s Dilemma game after the manipulation. The manipulation had a marginal effect on the participants measured as the between-groups negative mood after the cyberball. Cooperation was also predicted negatively by positive mood. People who reported to be low in the Joy subscale cooperated more.

In relation to the personal characteristics and mood, there was a correlation between the mood and the personality inclination towards action-orientation, in the direction that the action-oriented participants felt more in a mood than state-oriented participants. The relation between mood and personality differences can lead to two suggestions: or that the action-oriented people voluntarily reported to be more in a mood or that their self-regulation actions helped them to stay in fact in a more positive mood during the manipulation.

Our further goal of the research was to see why only several subscales detected the different experiences in the participants in relation to the ostracism manipulation. It was important for our experiments to construe a better manipulation that can have an impact on the cooperation. We entered the experience of Ostracism inside the Social Dilemma to see whether it would change the tendency towards cooperation.

## **Experiment 2**

### ***Hypotheses***

In Experiment 2 we tested the same hypotheses from Experiment 1.

H1) The cooperation rates in Iterated Prisoner`s Dilemma Game after exclusion should be higher in comparison with the control condition (inclusion).

H2) Ostracism would lead to lowering of mood; for this hypothesis we would check whether mood would differ in the two groups after the manipulation.

H3) Action-orientation as a personal characteristic may interact with mood leading action- oriented participants to cooperate more. We designed a second experiment so that we can gather more information about the impact of the threat of modern ostracism by programming a new interface in Matlab<sup>4</sup> allowing the manipulation of social exclusion to happen inside a long-repeated Prisoner`s Dilemma game. We upgraded the Matlab program (The MathWorks, 1993) of the Prisoner`s dilemma game we used in Experiment 1, with 2 additional options: to choose with whom to play and to be able to refuse to play. In that way, the game resembled more of a realistic situation.

### ***Method***

#### *Apparatus*

For the experiment, we used an interface for three players who took turns in choosing a second player that would play with them (after the 3- players version of the computer manipulation Cyberball of Williams & Jarvis, 2006). In the newly created program, the player had to choose first, with whom to play and secondly, what to play in the Prisoner`s dilemma game several times in a row. As in the previous experiment, the players were told that they participated simultaneously in a group, playing with two other players from the experiment, and in fact each of them played against a computerized program. We tried to preserve the conditions of the classic Prisoner's dilemma game and at any time there were two players playing simultaneously. This was the way to manipulate the condition of "excommunication" (social exclusion) on the third participant. We formed a group in which the participant from our experiment was "in" or was "not in" constant contact with the "other players".

According to our rationalities, this would create a tension on the subject as a threat to be left out of the group and would motivate him/her to regulate his/her behavior so as to be chosen for a partner in the further games and not remain outside the interaction with the other participants in the group.

In order to better visualize the processes, the participants could see on-screen the other players with two different colors- green and blue (see Fig.3).

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<sup>4</sup> MATLAB 8.0 and Statistics Toolbox 8.1, The MathWorks, Inc., Natick, Massachusetts, United States.



**Figure 7.** Screenshot of the Matlab Interface<sup>5</sup> of the Repeated Prisoner's Dilemma, in which the participant can choose with whom to play (Experiment 2). The real player is shown in yellow color and his/her moves between A or B are on the left of the screen. The moves of the fake player are shown on the top. The two fake players are shown in green and blue (when the green is “playing”, the possible moves of the green fake player are shown in green; when the blue is playing, the possible moves of the blue fake player are shown in blue next to the possible moves of the real player). In order to choose with whom wants to play, the subject has to click on the green or blue color button on the right of the screen. In order to choose what to play, the subject has to press the yellow A or B buttons on the left.

The players had the opportunity to play a different limited number of games in both groups, the possible maximum amount of games were distributed as stated in Table 4.

**Table 5.** The maximum amount of games in different periods of repetitive prisoner's dilemma in which the real players were able to take part (Experiment 2)

Diff.stages during the repeated game Condition	Stage 1	Stage 2	Stage 3
Repetitive game with ostracism	22	9	23
Repetitive game without ostracism	24	25	24

NOTE: For operational reasons as shown in the table, we separated the whole game of 90 moves in 3 stages. The first three rounds of the games are not included in the analyses as they belong to the trial session.

### *Design*

The design of the manipulation was thought to allow us to compare the two groups' behavior in a between-group comparison (the control group with fewer periods of non-playing and the group with ostracism- wherein a period of the game the subject was excluded continuously and was not able to take part in the game). In addition, we were able to track the process of how cooperation was changing in three periods (stages) of the game - "before," "during" and "after a period of isolation" in the group of ostracized compared to the group of the participants that stayed involved equally involved in the game as the other (fake) players (the control group).

*Dependent variable (DV)* - the level of cooperativeness in PDG estimated as a percentage of choices of C vs. D from all possible 30 one-shot games in the third period of the Iterated Prisoner's Dilemma Game (the period after manipulation).

*Independent variable (IV)* - the manipulation group with two levels (i.e. ostracism vs. inclusion) was used as a between-subject factor. The ostracism condition as mentioned previously was induced in the second stage of the IPD.

Furthermore, we entered the measures in a mixed model ANOVA with the stages of the cooperation rate in time as a within subject variable and the group manipulation (treatment) as a between-subject variable, to understand if there is an interaction between time and condition on the dependent variable – cooperation rate. Follow-up tests were performed to determine whether if there were changes in the cooperation, they were simply due to one of the factors (i.e., treatment or time).

*Mood.* For our second hypothesis (H2), that the ostracism would lead to lowering of mood, the independent variable of the mood was measured by a different from Experiment 1 questionnaire and we used only the positive items from the scale with possible outcomes from -3 to +3. The mood questionnaire is in Appendix B1.

*Action-orientation personality variable.* For our third hypothesis (H3), the DV was again the cooperation; the fixed factors were the overall mood after the manipulation and the action-orientation of the participants. The measure of action-orientation was calculated summing all 24 answers on the ACS-90 (Kuhl, 1991), coded 1 for state-orientation answer and 2 for action-orientation with the help of medium split (higher score for action orientation, lower score for state-orientation).

### *Procedure*

The experiment took place in the same laboratory of the NBU, as in the first experiment, equipped with three separate rooms. At the start of the experiment, two experimenters welcomed the participants and settled them in separate rooms. The subjects were asked to wait until the other players took their places to start the game. They were told that they would participate in a research on decision-making and that would play a game within a group of three people. Before getting familiar with the principles of the game, the experimenters handed out a questionnaire # 1 that was the initial mood assessment.

The mood questionnaire was distributed twice: before and after the game.

The two experimenters talked with the participants separately in the different rooms and if the group of three people that were necessary for the experiment, was not filled, an insider from the research team went into the lab cubicle pretending he/she is a subject participant and took the space reserved for the third party in the game (without playing really the game). In this experiment as in the first one, the subjects actually played against predestined computer programs.

After the first mood questionnaire, the respondents read the presentation with the special-made instructions for the game and the experimenters announced that the experiment may begin. Before the actual recording of points, the players went through three additional games to test the procedure without being recorded for any points. The participants were told that the three players with the best results in the tournament would receive a special award from the creators of the interface (a memory stick).

After the 30 rounds of the game, one of the experimenters recorded all the scores of the participants and again gave them a mood questionnaire. The participants filled in also the personality assessment ACS-90 that we used in the first experiment measuring the individual differences in action- orientation or state- action. The last questionnaire that had to be completed by the respondents was the feedback questionnaire. At the end, all the participants who were interested to get more information about the experiment had the opportunity to ask questions about the true purpose of the experiment.

*Participants.* The total number of subjects who participated in the experiment was 67. Among them, 53 had gone through all the instructions and completed the full set of questionnaires and went to the end of the game. The participants were mostly students from New Bulgarian University, mean age 24 ( $SD = 22.24$ ). The full analysis included the data from the 25 people from the ostracism group and the 28 people from the control group. The entire group of 53 persons consisted of 20 men and 33 women.

## **Results**

### *Cooperation*

The number of cooperative moves (move A) in the game varied between 0 and 41 ( $M = 17.60$ ,  $SD = 1.21$ ). The primary purpose of a mixed ANOVA is to understand if there is an interaction between the two factors on the dependent variable. To test our hypotheses, we calculated cooperation percentages in three periods each separated in 30 games for the time the participant had chosen A (cooperation) in the certain stage (phase). Having the percentage of cooperation as DV in a Repeated ANOVA with three levels (cooperation in first, second or third phase) of the game respectively, we entered the treatment as a between-group variable.

**Table 6.** *The Cooperation Means among Groups after transforming the data as such with normal distribution (Experiment 2).*

	<b>Ostracized Group</b>		<b>Control Group</b>	
	<b>M</b>	<b>(SD)</b>	<b>M</b>	<b>(SD)</b>
<b>Phase 1</b>	1.40	.50	1.37	.61
<b>Phase 2</b>	1.09	.79	1.33	.59
<b>Phase 3</b>	1.21	.52	1.19	.64

*Note:* None of the difference in the Means at the different stages was significant.

The observed F value for the main effect of time was statistically significant,  $F(2, 53) = 3.281$ ,  $p = .046$ , partial  $\eta^2 = .116$ , which indicated difference in cooperation over time. Overall in the two groups taken together, the average cooperation in the first period was higher ( $M = 1.38$ ,  $SD = 0.076$ , 95% CI [1.232, 1.538]) than the second ( $M = 1.217$ ,  $SD = 0.092$ , 95% CI [1.032, 1.401]) and the third period ( $M = 1.199$ ,  $SD = 0.080$ , 95% CI [1.039, 1.358]). The main effect of the group was not significant  $F(1, 51) = .233$ ,  $p = .639$ , partial  $\eta^2 = .004$ .

### *Mood*

In this experiment we replaced the mood questionnaire BEF-1R (Kuhl & Kazén, 1994) from the first experiment that contained answers in the scale only from 1 to 4 with one that had the possible answers from -3 to +3. The measure of mood was created by recoding the negative values into positive and summing all items (Mean = 1.5, Median = 1.44, SD = 1). The internal consistency was high - Cronbach's Alpha .924 for values before the game, and .939 after the game. The mood scale consisted of nine items: "I feel good," "happy", "pleased," "enthusiastic", "cheerful", "optimistic" "hopeful", "satisfied" and "calm".

The t-test did not show any significant difference ( $t(51) = -0.882, p = 0.382$ ) between the two groups in relation to the mood after the game, but again in the ostracized group the participants were with lower positive mood (control group ( $M = 1.56, SD = 1.01$ ), ostracism group ( $M = 1.44, SD = 0.89$ )). Generally, it can be concluded, that the positive mood in this experiment did not relate to the manipulation, in fact most of the participants (73%) declared to be in a good mood after the experiment in their feedback questionnaire. In addition, we decided to see whether the mood would show effect on cooperation.

### *Mood and Cooperation*

To check whether the mood was related to the cooperation, we did regression analysis with independent variable (IV) the positive mood after manipulation and dependent variable (DV) cooperation percentage in the third period that showed marginal significance ( $F(1, 51) = 1.740, p = .082$ ). The correlation of the mood before the manipulation and the cooperation in the first period was not significant ( $p = .685$ ). The positive mood correlated negatively with cooperation in the 3d period ( $r = -.300, p = .029$ ). The less in positive mood the participants were, the more they cooperated after the manipulation.

Splitting the results file by the different groups of the manipulation conditions, it was obvious that the statistical significance in the correlation between mood and cooperation was only in the ostracized group (ostracised group  $r = -.370, p = .068$  vs control group  $r = -.267, p = .172$ ).

### *Action orientation*

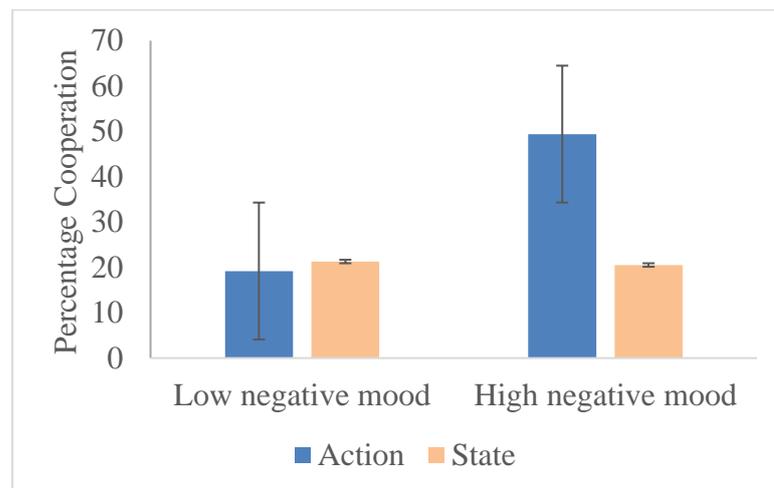
Entering the personality characteristics action-orientation in ANOVA we wanted to see whether we could enhance the predicting model of mood and cooperation.

*Descriptive.* The index of the personality characteristic orientation towards action or state was calculated with a medium split, where above the medium split the people were assigned as action-oriented and below- as an action- orientation. The internal consistency of the scale was with Cronbach`s alpha ACS = .723. AOF subscale was with Cronbach`s alpha ACS = .745 and AOD with Cronbach`s alpha ACS = .476.

The action control index correlated with gender, in the direction that men were more action-oriented than the females ( $r = -.276, p = .045$ ).

*Hypothesis 3.* To test whether personality differences related to the cooperation in Experiment 2 we did two ANOVA tests. The first test of the effect of the manipulation and personality features on cooperation on the third period (after the manipulation) yielded a significant main effect of personal characteristics action/state orientation ( $F(1,51) = 6.083, p = .017$ ). The effect of the manipulation ( $F(1, 51) = .398, p > .05$ ) and its interaction with the personality differences ( $F(1, 51) = 1.213, p > .05$ ) was not significant.

In the second ANOVA test instead of the group manipulation, we used the mood as a predictor. The ANOVA test of the effect of mood and personality characteristics we did on the cooperation percentage in the 3d period (after the manipulation) and it yielded a significant main effect of the personality characteristics action / state orientation ( $F(1, 48) = 5.956, p = .018$ ), main effect of mood after the game ( $F(1,48) = 7,188, p = .010$ ), and interaction of both factors ( $F(1,48) = 7.965, p = .007$ ). The model indicated a significant increase in cooperation of action-oriented in a bad mood.



**Figure 1.** Interaction between Mood (the measures of Low and High positive mood is divided by medium split) and Personality Characteristic (State vs. Action- oriented) on the Percentage of Cooperation in the 3d period of PDG.

Summing up the significant results from this experiment in relation to the cooperation, it can be concluded that the mood after manipulation, the action orientation and the interaction between mood and the action-orientation explained about 39% of the variance in the rate of cooperation in the 3d period (after the manipulation). The effect of action orientation explained 23 % with a statistical significance ( $p = .053$ ), the different mood (lo vs. hi positive mood) after the manipulation explained about 30 % ( $p = .018$ ). The people in low mood again cooperated more as in the first experiment.

### ***Summary: Experiment 2***

The cooperation did not differ significantly in the two groups, subsequently, the cooperation in the 3d period correlated negatively with positive mood, and we checked additionally whether the ingroup subjective differences were bigger than the between-group manipulation differences. The tendency in the third period of the game was that the cooperation depended on the interaction between mood and the action-orientation in the direction that

Furthermore, it could be suggested that creating a new version of PDG where the offers for a game can be accepted or refused and where the subject falls in a situation of an observer, made the conditions equally experimental, leaving us the experimenters with no control group. We decided in a third experiment to measure the Ostracism not only by a mood Questionnaire but by an extensive inventory that was used also by Williams (2007) in his studies on Ostracism.

### **Experiment 3**

#### ***Goals & Hypotheses***

In our first experiments, we could not detect a significant difference in the cooperation of the excluded participants in a game of Prisoner's Dilemma compared to the included, but we did gather some proof that the mood after the manipulation of ostracism related to the cooperation rate.

In our third experiment, we wanted to investigate the need-threat model (Williams, 2007; Lakin & Chartrand, 2005) and the moderators that influenced the experience of exclusion and the behavior of cooperation. We included a new Ostracism questionnaire (Williams et al., 2002) that consisted not only of measures for mood but also items related to the 4 fundamental needs that according to the literature (Williams, 2007) were connected to ostracism: the need for belonging, self-esteem, need for control and meaningful existence.

We tested again the main hypothesis:

H1: Ostracism manipulation would lead to cooperation.

The additional hypotheses:

H2: The mood would differ in the exclusion and inclusion group in the direction that in the exclusion group would be lower than the inclusion group.

H3: The personality differences would interact with the mood in the direction that action-oriented would cooperate more than state-oriented in a bad mood.

And a new hypothesis:

H4: The two manipulation groups (included vs. excluded) would significantly differ in the 4 subscales of Ostracism questionnaire that related to the fundamental needs in Kip Williams model: belonging threat, self-esteem, control and meaningful existence.

## ***Method***

### *Design*

For the main hypothesis, that the ostracism would lead to cooperation, we compared the percentage of cooperation in the two groups of manipulation (ostracised vs. included).

For checking whether the mood differ in the exclusion and inclusion group, we used a calculated value from the positive mood scale of the Ostracism Questionnaire (Williams et al., 2002) and compared it in the two groups of manipulation.

For the hypothesis that the personality differences interact with the mood in the direction that action-oriented will cooperate more than state-oriented in a bad mood, we used the mood variable and also the action orientation score created by the answers from Action control scale (ACS-90) as predictors of the cooperation.

For the fourth hypothesis, that the two groups (included vs. excluded) significantly differ in the 4 subscales of Ostracism questionnaire, we compared the average ratings on the subscales of the questionnaire in the two group conditions.

For the following experiment we created again a new program of PDG this time on a Netlog platform<sup>5</sup> so that the participants can be connected easier in a network. In Experiment 3, the participants played again like in Experiment 2 a two-person iterated Prisoner's dilemma game in a group of three. The participants were informed that the computer would assign them to play the dilemma with one of the players that were in the laboratory. In fact they once again played against a computer strategy which repeated the participant's move three rounds before. The Netlogo PDG program was played 30 games and here we did not have stages,

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<sup>5</sup> Wilensky, U. (1999). NetLogo. <http://ccl.northwestern.edu/netlogo/>. Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.

from the beginning in one of the groups the participants were more selected to play than in the other group.

### *Apparatus*

*Iterated Prisoner`s Dilemma Game.* For the following experiment we created again a new program of PDG, this time on a Netlog platform<sup>6</sup>, so that the participants can be connected easier in a network. In Experiment 3, the participants played, as in Experiment 2, a two-person iterated Prisoner`s dilemma game in a group of three. The participants were informed that the computer would assign them to play the dilemma with the players that were in the laboratory recruited in groups. In fact, they once again played against a computer strategy which repeated the participant`s move three rounds before. The NetLogo PDG program (Wilensky, 1999) was played 30 games, but without having the operational 3 phases that we had in Experiment 2 - straight from the beginning in one of the groups the participants were more selected to play than in the other group. The participants again had the option to choose with whom to play and whether or not to decline a game from a person they did not want to play with.

*Ostracism Questionnaire.* The Ostracism Questionnaire (Williams et al., 2002)<sup>7</sup> was a new part of our experimental work, again translated from an English version, containing 32 questions divided into 6 subgroups. To the most of the questions (except the last questions where the participants had to indicate the inclusion feeling by a percentage), the subjects had to answer in the range of 1 to 5, where 1 was "not at all" and 5 "very much".

The items in the first subset were directly applicable to the *Feeling of Being Ignored (Need to belong scale of Ostracism questionannire)*. This category consisted of the following statements: I felt "disconnected" from the group; rejected; outsider; and the statements: "I belonged to the group"(answers recoded), as well as "the other players interacted with me a lot" (recoded).

The items in the second subgroup were connected with the *Self-esteem* of a player during the game: " I felt good about myself"; "My self-esteem was high"; "I felt liked"; "I felt insecure" (answers recoded); "I felt satisfied."

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<sup>6</sup> The programming of the game was provided by Konstantin Dzekov (Dzekov, K. (2015). *Simpson's paradox effects on the cooperation in Prisoner's Dilemma Game: Group Effects*. Unpublished master's thesis, New Bulgarian University, Sofia, Bulgaria).

<sup>7</sup> The Ostracism questionnaire was provided by prof. Kipling Williams.

The items of the third subgroup were related to the *Need for Meaningful Existence*. The statements were the following: “I felt invisible”; “I felt meaningless”; “I felt non-existent”; “I felt important” (answers recoded); “I felt useful” (answers recoded).

The items from the fourth subgroup were associated with the feelings of the respondents about their *Control*: “I felt powerful”; “I felt I had control over the course of the game”, “I felt I had the ability to significantly alter events”, “I felt I was unable to influence the action of the others” (answers recoded); “I felt the other players decided everything” (answers recoded).

The items in the fifth subgroup of the Ostracism questionnaire were associated with the *Mood* of the respondents: “I felt: good, bad, friendly, unfriendly, angry, pleasant, happy, sad”, on the scale 1 to 5 (1-not at all, 5- very much).

The items in the sixth subgroup were Manipulation checks directly related to the experience of isolation. The instruction for answering those subgroup questions was as followed:” *Please circle the number to the right (or fill in the blank) that best represents the thoughts you had during the game. "I was ignored" and "I was included "(from the scale from 1 to 5). And the last question in this subgroup and in the questionnaire was: " Assuming that when participating in a ballgame, the ball should be thrown to each person equally (33% if three people), what percentage of the throws did you receive in the game?"*

### *Procedure*

The participants were assigned for the experiment in groups (with at least three people in one time). Coming into the lab they were placed in the lab rooms and were told that the computer would automatically allocate them to play in a group of three people. Before the start of the game, the participants were acquainted with the instructions on how to play. When at least three people have gathered in the lab, the experiment began. As in the previous experiment, the players were informed that the three people with the best results in the PDG tournament would win a special prize of the founders of the interface.

After the games, the experimenters handed out the Ostracism questionnaire. And in the end of the experiment, the experimenters handed the first questionnaires on the individual tendency on Action-state scale (ACS-90, Kuhl, 1990), a separate form for the feedback and declared that they were aware that in case of a question about the experiment they can get more information about the results and the real purpose of the experiment.

### *Participants*

37 participants took part in the experiment, 30 people went through all the procedures: 10 men and 20 women. The participants in the experiment participated in at least 13 games

and in a maximum of 32 games. From those people, 18 were in the excluded group and 12 in the included group. Mean Age 22 (SD=3).

## **Results**

### *Preliminary analyses*

A preliminary step was to look at potential correlations between the predictor variables and the outcome to see whether there was a relationship between the Ostracism scale (Williams et al., 2002) and cooperation. We entered the ratings of happiness, anger after the manipulation, the ratings on the feeling of being ignored, feeling of control, balance, self-esteem, and meaningless; the average score of cooperation into bivariate correlation to see whether any of our variables could predict the level of cooperation in the game.

In relation to cooperation, the average cooperation percentage in the whole sample correlated negatively with the declared feelings of being ignored. The more ignored felt the people, the less they cooperated ( $r = .386, n = 30, p < .05$ ). Cooperation correlated negatively also with the sense of balance. The more uncertain about the game felt the participants, the less they cooperated ( $r = -.383, n = 30, p < .05$ ).

In relation to mood, feeling of being ignored and control, people who felt ignored, felt also unhappier ( $r = -.681, n = 30, p = .063$ ). The less the participants felt to be a part of the group, the more anger they have experienced ( $r = -.707, n = 30, p < .05$ ). People who thought they have been less ignored thought also that they have retained control over the game ( $r = -.666, n = 8, p = .07$ ) and thought they could change the course of the game ( $r = .864, n = 8, p = .006$ ).

### *Primary analyses: Cooperation between groups*

*Hypothesis 1.* The percentage of cooperation ranged from 0 to 88 ( $M = 43.5, SD = 19.2$ ). An independent-samples t-test was conducted to compare the cooperation between the groups of ostracized and non-ostracized. Again we had insufficient evidence to reject the null hypothesis of equal means at the 0.05 level (95% confidence interval), meaning that the average cooperation in ostracism group ( $M = 44.5, SD = 16.04$ ) did not differ significant from the average cooperation in the inclusion group ( $M = 42, SD = 23.87$ ),  $t(28) = .344, p > .05$ .

## **Secondary analyses**

### *Mood*

*Hypothesis 2.* The consistency of the positive mood ratings from items: "I felt good/friendly/ pleasant/ happy/ satisfied" had an internal consistency Cronbach alpha =0.846.

A t-test for two independent samples with independent variable (IV) group manipulation (ostracism vs. inclusion) and dependent (DV) – the subscale of Positive mood

showed significant difference in the two manipulation groups ( $M(\text{ostracism}) = 3.28$ ,  $SD = .58$ ,  $M(\text{inclusion}) = 3.82$ ,  $SD = .64$ ,  $t(28) = -2.394$ ,  $p = .024$ ,  $d = 0.88$ ). The ostracized participants were in a lower positive mood in comparison to the control group and the Cohen's effect size suggested high practical significance.

#### *Individual inclination towards action or state orientation*

*Descriptive.* The ACS scale reached an internal consistency Cronbach's alpha of 0.729. According to the norms (Kuhl, 1994) the participants were classified as action-oriented if they were above the medium split of 37.20 people were in the group of state-oriented and 14 people were classified as action-oriented. The internal correlation of the two subscales that construed the questionnaire ACS-90 was as follows: AOF reached Cronbach's Alpha = 0.687. The internal correlation of AOD reached Cronbach's Alpha = 0.599.

*Hypothesis 3.* ANOVA of the effect of group and personality characteristics on cooperation did not yielded a significant main effect of personal characteristics action / state orientation ( $F(1, 21) = 337$ ,  $p > .05$ ), nor effect of the mood ( $F(1, 21) = .447$ ,  $p > .05$ ), neither an interaction between both ( $F(1, 21) = .433$ ,  $p > .05$ ).

#### ***Summary: Experiment 3***

In general, the ostracised and the control group did not differ in their cooperation. The mood and belonging were lower in the excluded group compared to the included. There was no main effect or interaction effect of the personal characteristics: action / state orientation on mood and cooperation. The inclusion and exclusion groups were different in their experience of belonging and happy feelings.

The conclusion from the Experiment 3 can be that our manipulation succeeded only partially measured by the subscales of Ostracism questionnaire (Williams, 2001).

For experiment 4 we decided to construe a different kind of manipulation to detect the subtle differences between a negative experience that can be measured only by the valence of mood and ostracism experience that is assessed by the need-threat model of Kip Williams (2001).

#### **Experiment 4**

##### ***General Goal of Experiment 4***

Ostracism may have a very wide definition because as I have mentioned before the need to belong relates to various experiences such as rejection, being ignored, having troubles with the group you belong to, or being simply dumped by a girl or boyfriend.

In the fourth experiment, we wanted to investigate how mood relates to cooperation in comparison to the specific effect of ostracism (defined as reading a social negative story of an exclusion). We contrast not only the effect of exclusion on that of the inclusion, but also the effect of the social event and that of other negative personal experience in relation to the cooperation in PDG.

### ***Design***

For experiment 4, we specified the outcome of ostracism as a group-related event comparing it to the outcome of an experience of an individual-related event. We thought of a design with 6 experimental groups that included valence and also the type of experience. For the design, we construed 6 stories: positive social, positive individual, negative social, negative individual, and neutral social, neutral individual story.

In a pretest, we compared the ratings of the participants of the stories on 3 items mood scale and on the Ostracism questionnaire items from experiment 3 (Williams, 2001).

For the main part of the experiment, we used all the stories as a method for mood manipulation including the negative social story as a method for induction of ostracism. Our IV - the group of manipulation in 3 (event valence: positive vs. negative vs. neutral) x 2 (event type: individual vs. collective) levels were entered in a between-group factorial design with the rate of cooperation as DV.

### **Experiment 4 - Pretest of Mood induction stories: Can an exclusion story induce experience of Ostracism?**

#### *Goals and hypotheses pre-test*

We had to construe the stories to be different in the valence of the mood but to have the same arousal level in order to compare their influence. The goal of the Pre-test of the Mood induction stories was to see, whether an exclusion story could induce an experience of ostracism.

SH1. In order to compare the effect of the stories on cooperation in the main part of the experiment, our first hypothesis for the pretest was that the negative and positive stories should not vary in their *arousal level*.

SH2. Our second hypothesis for the pre-test was that the negative stories would differ in valence from the positive stories, mainly the social negative story should differ in *pleasance* scale from the social positive story (presumably in this hypothesis, we were comparing a story with **exclusion** with a story with **inclusion**);

SH3. Our Hypothesis 3 for the pre-test was that the negative social and negative individual would not differ in their *valence* (negativity), but would be different in the fear of exclusion as a separate type of experience related to the ostracism manipulation (we compared the negative stories content by type *social* vs. *individual*) ;

SH4. Furthermore, we had to prove that the social negative story could induce ostracism, and for our 4<sup>th</sup> hypothesis we tested the social negative story on all the need-related dimensions of the Ostracism questionnaire (Williams et al., 2002) used in Experiment 3, suggesting that the social negative story (with *exclusion*) would significantly differ from the social positive story (*inclusion*) on the items: need to belong, fear of exclusion, helplessness, meaningless and control over the situation.

All those hypotheses were pretested before the main Experiment 4 because we did not want to waste the effect of the manipulation when rating the scales in the main experiment right after the manipulation.

### ***Method***

In the Scenario Immersion Technique, the participants read (or hear) embodied scenarios and experience a narrative as it unfolds. In the story mood induction procedure, the vignettes are used in the way that each participant is presented with the same standardized story. The method is proved as ecologically valid (e.g., Wilson- Mendenhall, Barrett, Simmons, & Barsalou, 2011). Generally, the participants vary in the ability to engage in mental imagery which increase variability, but the effect size for imagination is still reliable  $r = .42-.61$  (Quigley, Lindquist, Barrett, Feldman, 2014).

*Manipulation Stories – Design.* We constructed six stories with the same length of 189 Bulgarian words.

The purpose was to vary the stories by 2 dimensions:

- Valence (3 levels - positive, negative, neutral)
- Type (2 levels: Social vs. Individual)

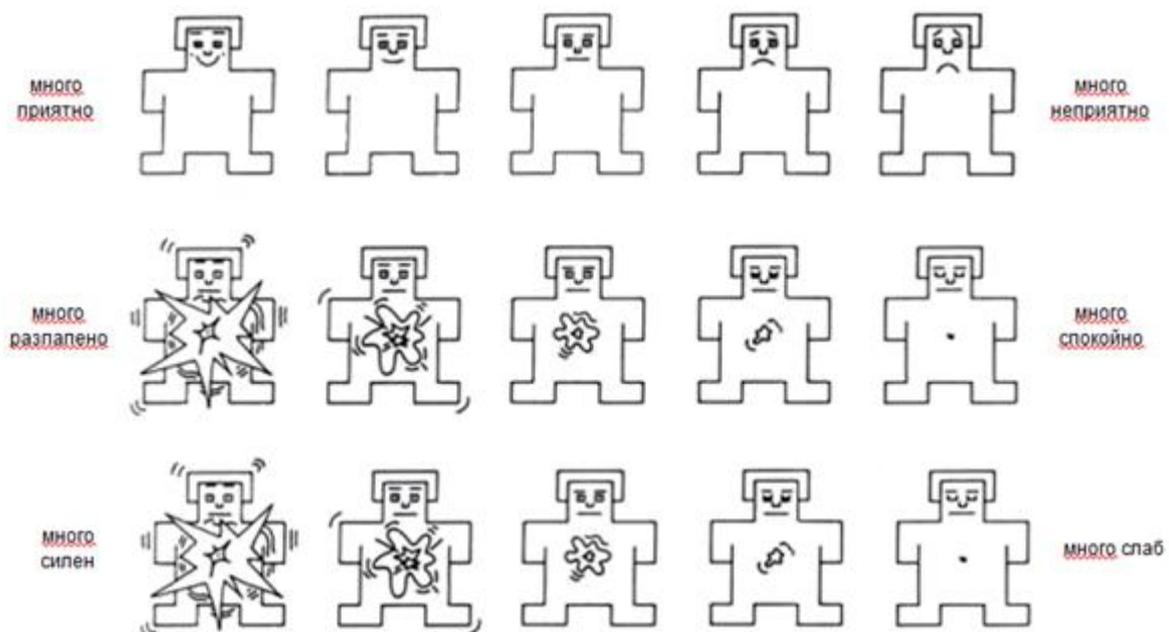
All six stories in Bulgarian language can be found in Appendix D1.

### ***Rating Scales***

In the pretest we compared the ratings of the participants of the stories on the 3 dimensions of what is called set of figures SAM (Self-Assessment Mannequin; Bradley and Lang, 1994) related to the valence and arousal of the experience; 3 mood items (sad, depressed and angry, used also in experiment 1 to 3) and on several items from Ostracism questionnaire from Experiment 3.

First were the items of SAM (Bradley and Lang, 1994) below in Figures 14. SAM shows three different kinds of feelings: Happy vs. Unhappy, Excited vs. Calm, and Controlled vs. In-control. Each SAM figure varies along each scale. The first SAM scale is the happy-unhappy scale, which ranges from a smile to a frown. At one extreme of the happy vs. unhappy scale, one felt happy, pleased, satisfied, contented, and hopeful. The other end of the scale is when one felt complete, unhappy, annoyed, unsatisfied, melancholic, despaired, bored. The figures also describe intermediate feelings of pleasure. If one felt completely neutral, neither happy nor sad, he/ she underlines the figure in the middle. The excited vs. calm dimension is the second type of feeling. At one extreme of the scale is when one felt stimulated, excited, frenzied, jittery, wide-awake, aroused. If he/ she felt completely aroused reading the story, the participant underlines the figure at the left of the row. At the other end of the scale, when one felt completely relaxed, calm, sluggish, dull, sleepy, unaroused, he/she should indicate the experience of completely calm by underlining the figure at the right of the row. The last scale of feeling that SAM represents is the dimension of controlled vs. in-control. At one end of the scale are the feelings characterized as completely controlled, influenced, cared-for, awed, submissive, and guided. At the other extreme of this scale, is being completely controlling, influential, in control, important, dominant, and autonomous. The large figure represents the feeling of importance and influence, and the very small is when one feels controlled and guided. If the participant neither felt in control nor controlled, he/she should underline the middle picture.

The participants had to answer: “How did you feel reading the story?”



**Figure 14.** Self-Assessment Mannequin, Bradley and Lang (1994), (in Bulgarian language).

Note that the first *SAM scale* (Bradley and Lang, 1994): Being controlled (weak) vs. in control (strong) is also related to the ostracism construct (the sense of control in the Ostracism questionnaire, Williams et al. 2002, see Experiment 3),

Afterward, the participants had to answer 3 questions related to their *mood* condition on a 5 – point Likert scale (1- Not at all; 5- Very much):

- How sad did you feel?
- How much depressed?
- How much angry?

Five other items measured the ostracism (from Ostracism questionnaire, see Experiment 3):

- Did you feel helpless?
- Did you feel included in a group? (a question- related to the need to belong):
- Did you fear to fall out of a group? (a question- related to the need to belong)
- Is your self-esteem high? (a question- related to the self-esteem)
- Did you feel your existence as meaningless? (a question- related to meaningful existence)

The possible answers were again on a 5 –point scale (1- Not at all; 5- Very much).

Separate questions were asked in relation to guilt and the Scenario Immersion Technique on a 5 –point scale (1- Not at all; 5- Very much):

- Did you feel guilty? (related to the attribution of the outcomes to the self or to the situation)
- How strongly did you feel yourself in the situation? (level of immersion in the situation)

#### *Procedure Pre-test*

The participants received the stories through their e-mail in a document and were asked to send their ratings after each story on the specially prepared questionnaire that consisted of all 13 items. Each participant had the option to read and rate all the stories. In the instructions was said that we would measure the ability of people to imagine how the person who has experienced the situation felt. The participants were asked to try to experience the emotions of the protagonist as their own and afterward to rate how deep they felt into the situation. After the blank was filled with the ratings, they had to return it to the researcher.

### *Participants*

The pretest was done with 30 volunteers, 18 women and 12 men (age  $M = 20$ ). Because the testing was voluntary, some of the participants selected only particular stories to rate and we received fewer ratings on other stories. 16 participants rated the social negative, social positive story and individual neutral stories. 15 participants rated the individual negative story; 13 participants rated individual positive and social neutral story.

### **Results**

#### *Differences between groups in the ratings of the Arousal level*

For *subhypothesis 1* (SH1 concerning the arousal level of the stories), we used a Chi-square test where an association between the different stories and their arousal level was not observed,  $\chi^2(20) = 19.747$ ,  $p = .474$ . So we presumed that the stories were with a similar level of arousal.

It can be concluded that the mood stories did differ in their valence, but did not differ in their arousal level (exception is the neutral individual story, see Appendix D2).

#### *Pleasance of the stories*

Secondly, we wanted to see whether the stories did differ in their pleasance (SH2). For *subhypothesis 2* (SH2- concerning the different valence of the stories), we used a Chi-square test for an association between the different stories and the item Pleasance measured through SAM (Bradley and Lang, 1994). Here the Chi-square test showed that there was a significant association between the different stories and their valence,  $\chi^2(20) = 93.108$ ,  $p = .000$ . Combining the results from the two Chi-square tests, we assumed that the mood stories did differ in their valence, but did not differ in their arousal level (exception made the neutral individual story, see Appendix D2).

#### *Comparing ostracism (social negative story) to other negative events (individual negative story) - SH3*

The other performed Chi-square tests suggested that there was no significant group difference between the negative valence conditions in the dimensions: pleasant, arousal, control, sadness, depression, anger ( $p > .05$ ; note that we performed also independent sample T-tests for more statistical verifications with all the groups two by two, for tables of significance see Appendix D2).

The same was valid for Inclusion group; there was no difference in positive valence group (*included vs. fortunate*) in the different mood dimensions of SAM (see Appendix D2,  $p > .05$ ).

Concerning the ostracism subscales, the *fear of exclusion* (SH3) was affected significantly higher in the social negative group in comparison to the individual negative group (Appendix D2;  $p = .049$ ).

In sum, it can be concluded that the negative social and negative individual story did not differ in their valence, but they did affect the participants significantly different in the direction that the story with exclusion (ostracism) led people to fear more from being left out of a group.

#### *Exclusion (social negative story) vs. Inclusion (social positive story)*

For SH4, we tested on which other dimensions the social negative story differed from the social positive story. We expected that if the social negative story induced successful ostracism experience, the two groups (excluded vs. included) should differ on all the scales related to ostracism.

Namely, the two groups should differ in the belonging, meaningfulness, and helplessness scale. The t-test showed a significant difference in belonging ( $t(27) = -5.92, p < .001$ ) between the two groups. After reading the social negative story the participants felt less part of a group ( $M = 1.63, SD = 1.09$ ) than the people who read the social positive story ( $M = 4.06, SD = 1.24$ ), also felt their life more meaningless ( $M = 2.92, SD = 1.19, t(25) = 4.41; p < .001$ ) and more helpless ( $M = 2.8, SD = 1.65$ ) in comparison to included participants ( $M = 1.21, SD = .80$  and  $M = 1.31, SD = 1.01$  respectively). The excluded group felt more being controlled ( $M = 4, SD = .1, t(27) = 7.36; p < .001$ ) than the included group ( $M = 1.75, SD = .86$ ).

Taken together, these results suggest that the stories successfully induced feelings of social exclusion and inclusion respectively.

### **Main Part (Experiment 4)**

#### *Apparatus*

*Prisoner's Dilemma Game.* The repeated PDG used in Experiment 4 was the same as this used in Experiment 1 (see Figure 3), programmed on a Matlab program with 30 one-shot games (instead of 50 one-shot games that were in Experiment 1) developed to mimic a real-world interaction between two participants. The cooperation and defection choices were labeled as "A" and "B" without any relation to the words cooperation and defection. The real player could choose to either cooperate or defect (A or B) while the computer program was set to respond according to the Tit for 2 Tat. This strategy is more forgiving and defects only when the opponent has defected twice in a row (Axelrod, 1990). The participants were recruited in groups of two and they were told that they would play between each other in fact they played against a computer.

For the manipulation, we used the 6 stories we have already constructed and tested in the pretest for mood and ostracism induction.

### *Procedure*

The experiment was conducted in the NBU's laboratory. The participants were recruited to take part in the experiment in groups of two. Entering the lab, they were welcomed and settled in 2 separate cabins. The participants were presented with a specially made instruction presentation where each one also found his/her story to read. At the end of the story, the participant had to rate how much the story affected him/her and they were introduced to the rules of the next task: a contest game. The subjects were told that three of the players with the best results in the PDG tournament would receive a special price from the creators of the interface. The experimenters asked some trial questions to make sure that the participant had understood the rules, and announced that the game between the two players in the experiment would begin. After the end of the 30 rounds, one of the experimenters wrote down the participant's scores and hand out a final feedback questionnaire form.

### *Participants*

The sample consisted of 111 participants aged 19-54 (mean age 24,  $SD = 5.3$ ). It was composed of 76 women and 35 men, most were students from the NBU. 19 people were distributed to read the social positive story, 19 read the individual positive story, 18 people read the social negative story, 18 – the individual negative story, 17 people read the neutral-individual story, 20 people read the neutral-social story.

### *Results*

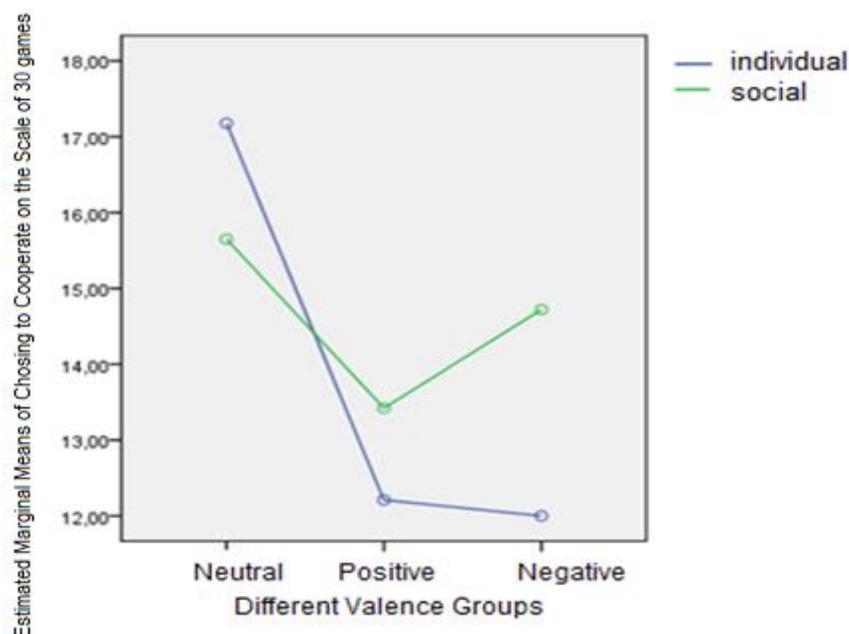
*Cooperation among groups (Valence by type of the story).* The tendency to collaborate in PDG among the subjects ranged from cooperating once to 30 times choosing cooperation (button A) ( $M = 14.31$ ,  $SD = 6.4$ )<sup>8</sup>. To investigate whether an interaction between type and valence of the story had an effect on the cooperation, we performed a 2 factors one-way ANOVA with a 3 levels (event valence: positive vs. negative vs. neutral) x 2 (event type: individual vs. social) that yielded main effect of valence, ( $F(2, 105) = 3.52$ ,  $p = .03$ ), and non significant results for type of event ( $F(1,105) = .451$ ,  $p > .05$ ) and the interaction between valence and type ( $F(2,105) = 1.071$ ,  $p > .05$ ).

**Table 11.** Means and standard deviations for each group on the stories (the valence factor in the column and the type of event in the row structure).

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<sup>8</sup> The mean is calculated when entering the value of cooperation that is the times the participant has chosen button "A" in the period of 30 games (varies from 0 to 30).

Mood	Type of Story			
	Social		Individual	
	M	(SD)	M	(SD)
Negative	14.72	6.75	12	4.34
Neutral	15.65	6.66	17.17	6.67
Positive	13.42	5.60	12.21	6.17



**Figure 16.** Interaction Plot: Valence vs. Type Factors Group (Experiment 4).

As you can see from Table 11, the people who cooperated the most, were those in neutral group ( $M = 17.17$ ,  $SD = 6.67$  for *individual* neutral and  $M = 15.65$ ,  $SD = 6.66$  for *social* neutral). To investigate the profile of the people who cooperated most, we checked the moves inside the group of individuals who had read a neutral individual story. It turned that all the people who choose move 1 (to cooperate) in all of 30 one-shot games were from one and the same group who read neutral-individual story (3 people from 17 – quite small number but for our sample was crucial), meaning that the accumulation was due those 3 people who chose button A throughout all 30 single-shot games. The Shapiro- Wink test for normality (Razali & Wah, 2011) also gave evidence that we could not assume the neutral individual group to be normally distributed ( $p = .041$ ).

We excluded the neutral group to investigate the preliminary data concerning our main hypothesis. As a more sophisticated analysis of categorical variables, we performed

Generalized Estimation Equation choosing the binary model (using the choices of the participants “0” for defection, “1” for cooperation, and the treatment groups as predictors (coding the individual neutral group to be the reference group). The significant differences in the parameters of the groups existed in the comparison of the *individual neutral*: with the *social positive* group ( $\beta = .634$ ,  $SE = 0.27$ ,  $p = .019$ ), with the *individual positive* ( $\beta = .905$ ,  $SE = 0.29$ ,  $p = .002$ ), and with the *individual negative* ( $\beta = .580$ ,  $SE = 0.24$ ,  $p = .017$ ). The cooperation differenced between the individual neutral and the *social neutral* and *social negative group* (with ostracism) were not significant.

**Table 12.** Unstandardized coefficients of the Regression in GEE entering all treatment groups.

Group	GEE Unstructured			
	Unstandardized coefficients	SE	95% CI	
			Lower	Upper
Positive Social	.634	.27*	-.900	-.011
Negative Social	.364	.30	.105	1.162
Positive Individual	.905	.30**	-.203	.930
Negative Individual	.580	.24*	.328	1.483
Neutral Social	.313	.28	.104	1.056
Neutral Individual	0a	.	-.234	.859

N groups = 6; 114 participants. \* $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .0$

### Primary analyses

*Hypothesis 5.* To reject the null hypothesis that included (people who read the *positive social* story) and the excluded (people who read the *negative social* story) cooperated at the same level (concerning SH5), we performed two tests. First, we used a chi-square test with the average cooperation of each participant in the 30 one-shot games as rows and the type of the group (social vs. individual, excluding all neutral cases) in the columns. As a second analysis, we performed the non-parametric Mann–Whitney Wilcoxon (MWW) test.<sup>9</sup>

<sup>9</sup> In Experiment 4 we used non-parametric tests, as a T-test is appropriate for small samples ( $n < 30$ ) while a Z-test for moderate to large samples ( $n > 30$ ) (see: Difference Between Z-test and T-test | Difference Between <http://www.differencebetween.net/miscellaneous/difference-between-z-test-and-t-test/#ixzz54jiCLdLv>).

Our expected value percentage in the chi-square was very much over 20% (it was 100%) meaning that the data has violated the assumption. As I mentioned before, the limitations of this test include its sample size requirements, the difficulty of interpretation when there are large numbers of categories (20 or more) in the dependent variables as in our case (McHugh, 2013). The second step was to read the Likelihood Ratio in the chi-square test, again not significant =.406 that gave evidence to accept the null hypothesis and to conclude that there was no association between the difference of valence of the social group (e.g. social negative vs. social positive) and the cooperation rate.

When using all the moves cooperation vs. defection in the sample, the MWW test was again not significant. The distributions in the two groups did not differ significantly (*Mann–Whitney*  $U = 1.51$ ,  $n(\text{social negative}) = 540$ ,  $n(\text{social positive}) = 570$ ,  $p > .05$  two-tailed) in relation to their cooperation.

*Subhypothesis 6.* To check whether the *type of the event* was of an importance for one and the same valence groups (i.e. the negative mood treatment), we used the nonparametric MWW test but now with the average cooperation of each participant in the 30 one-shot games and comparing the *social negative* and the *individual negative* group. Secondly, we used the chi-square test but with the accumulated moves of all the participants in the 30 one-shot games (to have only two categories: cooperate vs. defect) as rows using the type of the group (social vs. individual and excluding all neutral cases) in the columns.

The MWW test was again not significant, the distributions in the two groups did not differ significantly (*Mann–Whitney*  $U = 131.5$ ,  $n(\text{social negative}) = 18$ ,  $n(\text{individual negative}) = 18$ ,  $p > .05$  two-tailed) in relation to their cooperation.

But taking into account the cumulative moves of all the participants (cooperate - coded “1” vs. defect – coded “0”), the chi-square gave evidence that there was an association between the type of the story (*social vs. individual*) and the cooperation observed,  $\chi^2(1) = 5.717$ ,  $p = .035$ <sup>10</sup>.

The results on the two explored hypotheses showed:

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<sup>10</sup> Our expected value percentage was not over 20% (it was .0%) meaning that the data did not violate the assumption.

- 1) That as in the previous results we did not have evidence for differences in the cooperation between the two social event treatments (reading *social inclusion* and *social exclusion* story).
- 2) Looking at the differences in the cooperation moves comparing the negative treatments depending on the type of the event (*social* vs. *individual* story), we observed that the number of the cooperation moves in the social negative treatment was higher than the cooperation in individual negative treatment. Moreover, the differences were bigger when comparing the defection moves in the two groups (See Figure 17).

#### **Summary: Experiment 4**

The pretest suggested that the participants rated the content of the stories as meeting the requirements for the purpose of the manipulation. From the feedback of the participants, it can be assumed that the stories affected the mood as was our aim and also the sense of belonging. The pretest results gave reasons to believe that the new instrument of six stories can be successfully used in further studies as a methodological tool.

As in previous studies, in the main experiment there was no difference between the level of cooperation of ostracized and non-ostracized people, there was a difference of the behavior of people who were subjected to social manipulation vs. individual event manipulation. After reading negative individual story the individuals defected more in a subsequent Prisoner`s Dilemma game than people who read social negative story (with ostracism).

Looking at the trends that were not significant, in line with our hypothesis, people who read negative social story cooperated more than those who read a positive social story (H1 in Experiment 1-3 and SH5 in Experiment 4). Overall people who read social stories cooperated more when there was an emotion in the story (either positive or negative). Also, people cooperated more after reading negative stories than positive. The most surprising finding was that people who read neutral stories cooperated at most. By collecting further data with bigger samples, we can see whether the effects are robust or only fictional.

## 4. Summary and Discussion

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### **Did the Ostracism Lead to Cooperation?**

In our four studies, we had a common hypothesis that the ostracism will instigate people towards cooperation. In all the experiments, we compared the behavior of the included and the excluded in relation to their cooperation in a PDG and we could not find a statistical difference.

In the first experiment, we did not find a significant difference in the two experimental groups (those who received the ball equal number of times as the other players compared to those who received the ball only at the beginning of the game) in the Prisoner's Dilemma game after the manipulation of Cyberball game. In this experiment, the gender predicted cooperation (men cooperated more than women). The tendency that was previously suggested from Rapoport & Chammah (1965), but that was not repeated in the next experiments.

In experiments 2 and 3, the cooperation was again not significantly different between the inclusion and exclusion groups. However, the data from the third experiment, suggested that the manipulation of the ostracism inside the repeated PDG was reliably measured by the ostracism questionnaire and the scales of the questionnaire which were assessing the experience of ostracism, did predict cooperation.

### **Did the Negative Mood Predict Cooperation?**

In relation to the mood findings, in the first experiment, cooperation was predicted negatively by positive mood. We can think of two interpretations why the effects of mood, but not of the group manipulation were significant: first, the manipulation of ostracism did not work for all of the participants; second, the cooperation could be comprehended as an instrument for feeling better in a situation of being left out by a group, but the fact that the individual was confirming to the social norms with a pro-social behavior in a situation where the other person treated him/her bad, made the ostracised participant feel worse and brought mixed feelings of anger, sadness and motivation to boost one's self-esteem.

The tendency in Experiment 1 was that the people, who reported to be low in the Joy subscale, cooperated more. The correlation of the mood and cooperation in the third period of the PDG in Experiment 2 again was in the same direction and the people in negative mood cooperated more. However, the results of Experiment 2 can question whether the participants reported their genuine mood. The ratings of the mood after the manipulation were contradicting as in the ostracized group there were many participants who said that were more

in a mood, compared to the included participants. It is doubtful whether the role of the reported emotion in such occasions is hedonistic or instrumental in the terms of Tamir, Mitchell, and Gross (2008). The authors develop a theory where they divide the hedonistic benefits of the emotions from the benefits of the targeted emotions that are prevalent in different cultural context. In their studies, they tested whether people seek self-inflicting of anger when preparing for a confrontation. For example, although participants recognized that induction of anger was unpleasant, they preferred immerse in anger in case of confrontation. Such striving for self-inflicting emotion was mediated by the belief that to steam off anger would be beneficial and the suppression would fail to help for a successful implementation of a goal. The authors introduced the idea of "emotional purposes". Their conclusion was that people would be devoted to unpleasant emotions when they expected those emotions would assist them to achieve their goals. This can be valid also when discussing the finding of positive emotions. The emotional regulation in healthy subjects upon threat leads to an increase in the positive and reduction of negative emotions (Gross, 1998). The automatic regulation of emotions can be helpful because in this way, people (1) use effective strategies to regulate, and (2) seek an adaptive purpose for his/her emotion

Since in our second experiment, the ratings of the mood were not correlated with the group manipulation condition, in the third experiment we tried to establish the differences between the ostracism manipulation and mood, measuring the effect of the group manipulation differences not only by mood but by a separate questionnaire which Williams (Williams & Jarvis, 2006) has used before in the studies on ostracism. Although it seems intuitive that rejection will have a negative effect on mood, previous studies raise doubts whether rejected individuals report more negative mood (e.g., Buckley, Winkel, & Leary, 2004) or no difference in the mood (e.g., Twenge, Catanese, & Baumeister, 2002) compared to non-rejected participants. We also could not find a consistent relationship between the declared general mood and the experience of rejection on a group level.

Looking at the trends that were not significant, in line with our hypothesis, people who read *negative social story* in our experiment 4, cooperated more than those who read a *positive social story*. Overall people who read *social stories* cooperated more when there was an emotion in the story (either positive or negative). Also, people generally cooperated more after reading *negative stories* than *positive*. In this experiment 4, we found that when reading a *negative social story* (with **ostracism**) people cooperated more than if reading only **negative** valence story.

For further research, we should have a closer look what connotation has the social emotion for the decider and how it reflects the individual's needs and understanding of the situation. PDG is a very strong tool for modeling social interactions and can be very challenging for entering and studying emotions in the social dilemma games in a further studies. Though construed to be neutral, the stories in Experiment 4 raised various thoughts in the players' head. One of the participants who had read neutral individual story said: "I was missing the sociality in the story". This particular participant used 30 times choice 1 (cooperating) probably searching for the social contact in response. By collecting further data with bigger samples, we can see whether the effects are robust or only fictional.

### **Did the Construct of Action-orientation Relate to Coping with Negative Mood and Ostracism?**

Straight from the first experiment, when we detected that the mood after the manipulation did not differ significantly in the two groups, neither differed the cooperation after the manipulation, we checked the additional hypothesis that there could be ingroup subjective differences that are bigger than the between-group manipulation and can account for the non-significant results.

We tried to find in-group variances in relation to the personality orientation towards action or state (measured by ACS-90, Kuhl, 1994) and cooperation (H3). Previous studies of authors such as Fuhrman and Kuhl (1998) have shown that the action-oriented people habitually cope better under difficult conditions. The assumption that the action-oriented people could cooperate more under negative mood was partly confirmed (Experiment 1 & 2).

In relation to the interaction between the personality characteristics and mood, in our Experiment 1, the action-oriented participants were more in a positive mood from the beginning to the end of the experiment. Webb et al. (2012) explains that the action-oriented people down-regulate negative affect and try to stay only positive no matter to what kind of manipulation they have been subjected.

If we speculate theoretically on this finding, for the action-oriented to be positive after a negative event in real life would mean more chances to be included again in the group. Our results are in line with previous studies on the effects of the mood-regulation and psychological arousal adjustability. To be adaptive in a life perspective is associated with reduced depression (Rholes, Michas, & Shroff, 1989) and reduced aggressiveness to stressors.

## **Difficulties in the Experimental Studies of Ostracism**

In beginning of our research, additionally to the cooperation hypothesis, we wondered whether the exclusion experience can be measured by the reported negative mood after the manipulation. The hypothesis test involving the measurement of the negative mood was with a marginal significance between the groups indicating that ostracized participants were in a higher negative mood than the included participants in the cyberball. With a perspective, we wanted to see whether a more complex situation would change the picture.

In experiment 2, we entered the experience of ostracism inside the Social Dilemma and we wanted to compare again the outcome on mood and on cooperation. The results of this experiment raised many questions. We can assume that the establishment of a new version of a repeated Prisoner's dilemma involving three persons that took turns and where the offer for a game was accepted or rejected, made both conditions equally experimental. By changing the manipulation and substituting the mood questionnaire, we thought we could enbetter the ostracism manipulation and its measurement. Unfortunately, in experiment 2 it was doubtful whether we had any control group. Inside the new version of a long-played Prisoner`s dilemma game with two conditions, wherein both you could be selected or not from another participant in the game, the individual comprehension of inclusion and exclusion was not dependent on the group. In general, we found that in a Prisoner`s dilemma game where the people were in groups of 3, and where the excluded had also the option to exclude others, it was difficult to control the exclusion to be in equal amounts of time. By construing such instrument, we predisposed that each of the participants in the game experienced exclusion from time to time leading to problems in distinguishing the behavior of the manipulation and the control group.

We tried to specify the experience of Ostracism in the next studies. In Experiment 3, we measured the ostracism by a separate questionnaire that was tested before by Williams & Jarvis (2006), and which related to the needs the ostracism threatened. In experiment 3, we detected that the more ignored felt, the less cooperative were the participants. People did not cooperate, if they did not feel balanced. Those who felt less ignored, thought also that they have retained control over the game and could change its course. The participants, who did feel ignored, felt significantly unhappy. And if one did not feel to be part of the group, he/she experienced significantly more anger. In our sample, the people in the two manipulation groups did not differ regarding self-esteem, meaningful existence and feelings of control. Moreover, the action orientation correlated with the treatment group, which may suggest that because in this specific experiment we measured the action tendencies after the manipulation,

people were influenced by the manipulation causing people in ostracized group to be more action-oriented. The conclusion from the Experiment 3 can be that our manipulation succeeded only partially assessing it through the subscales of Ostracism questionnaire. The mood and belonging were lower in the excluded group compared to the included, but the manipulation was not so strong to affect the sense of self-esteem, meaningful existence and control over one`s life. In that direction, Williams (2007) explain that the threat of belonging and self-esteem usually motivates people to please others in their group, and the existence of a threat to the one`s sense of control and meaningful existence can lead to aggressive and even provocative tendencies

### **Did We Measure the Impact of Ostracism or of any Social experience?**

Our further goal for Experiment 4, was to see why only several subscales detected the different experiences between groups in relation to the ostracism. It was important for our research to construe a better manipulation that can have an impact on the cooperation. We tried to have less interactive manipulation by entering the manipulation inside a “reading of a story“instrument.

We planned to clear out our model in Experiment 4, investigating whether the ostracism experience differs from other negative valence experience, again measured by the effect on the rate of cooperation. Inspired by the idea that the ostracism can be described not only as a negative but as a negative event related to a group, in Experiment 4 we decided along with the main question whether ostracism instigates cooperation, additionally to investigate new research questions:

- Does being excluded differ in an affective state from being misfortune?
- Can a social negative story be a more successful manipulation of ostracism than the manipulation we used in the previous experiments?

The results of the pretest showed that the inclusion and exclusion groups were different in their experience of belonging and happy feelings. Moreover, the pretest suggested that the participants rated the content of the stories as meeting the requirements for the purpose of the manipulation and gave us reasons to believe that the new instrument of six stories can be successfully used in further studies as a methodological tool.

However, I should admit, that having changing our instruments, the different manipulations were difficult to be matched. The decision-making literature distinguishes situations involving risk from those involving uncertainty (Johnson and Busemeyer, 2010). For example, the situations involving risk are associated with the probabilities of obtaining

each of the outcomes. In the situations involving uncertainty the outcomes are unknown and one must have learned from experience, and then the individual presumably act upon habits. PDG can be used to study both. Talking about the emotions that are processed in the same region of the brain, which is activated when individuals are facing both uncertain and risky decisions (Hsu and colleagues, 2005), we had to distinguish whether the individual mirrors the PDG as facing risky decision upon calculation game or facing uncertainty of been or been not involved in a social game and not inside a contest.

It seems that the decision-making upon negative affect and upon the threat of being left out of a group can be two different things. Our studies do not support the idea that the ostracism instigates cooperation in further interaction with the group. The main suggestion of the data is that the people, who report to be affected from the exclusion by lowering of their mood or by lowering the level of satisfaction of their need to belong, may try to cooperate later with those who ostracise them, but the cooperation attempts would not last long. Furthermore, to be in a negative mood due to other negative event may have different outcome on the decision whether to cooperate or not.

## **5. Summary of Contributions**

1) Theoretical contribution: How individual comprehends social pain and processes negative affect has not been studied previously in relation to social dilemmas. Our research can be linked to the theories of Fischer and colleagues (Fischer and Manstead, 2008) of the intergroup emotions, of collective emotions (Sautter, 2006) and to studies on social decision-making (Ketelaar & Au, 2003). The research contributes new knowledge to the topic of ostracism by introducing a personality variable that have not been previously studied in relation to the effects of social rejection. We demonstrated that with the adaptations of a model which includes the variable such as Action control (Kuhl, 1994), proposed in our experiments, we can enrich the Kipling Williams model (2001) of processing rejection (reflective and reflexive stages). The integration of the personality characteristic Action orientation into that model gives prospect to investigate how certain people are able to self-regulate better under social negative affect. It can be that the action-control participants in negative mood felt less insecure with the use of cooperation. Hertel and

Kerr (2000) suggest the subjective feeling of security is one of the central mediators of the mood effects.

2) Empirical Contribution: Based on previous contradictory results whether social rejection leads to negative mood or negative mood mediates its outcomes (Leary, 1990; Williams, Cheung, & Choi, 2000), we have raised the hypothesis that people in negative mood will cooperate more after manipulation of exclusion. We have identified an effect of negative social mood (after manipulation of Ostracism) on cooperation in PDG and this is an important finding as it is in a contradiction with the previous suggestion that positive mood people are more cooperative (e.g. Bierhoff, 1988, Salovey, Mayer, & Rosenham, 1991). The tendency we detected is in the direction of the studies of Hertel, Neuhof, Theuer, and Kerr (2000) who explain that the more insecure are people, the more they cooperate. In all four experiments we could not find statistical differences between the behavior of the groups of included and excluded participants in general, but we had one and the same tendency showing that people in low mood cooperated more than those in positive after manipulation of social rejection.

3) Methodological Contribution: for this dissertation, we created a method that offers an innovative analytical approach combining theories of cognition (Selten, 1999) with theories of emotions (Baumeister and Leary, 1995). In each of our experiments, we used different exploratory tools. In experiment 1, we used the innovative Cyberball (Williams & Jarvis, 2006) in combination with Prisoner's Dilemma Game (PDG). For Experiment 2, we<sup>11</sup> created an interface in MATLAB<sup>12</sup> of PDG for three players, where the participants took turns in choosing a second player that could play like a partner (after the 3- players version of the computer manipulation Cyberball of Williams & Jarvis, 2006). For Experiment 3, we developed the idea of this model into an updated program on a Netlog (Wilensky, 1999) platform where the participants could be connected easier in a network such as the Internet. For the experiments, we translated several questionnaires from English language to Bulgarian language and backward and gathered sufficient data with Bulgarian participants to assure the internal consistency. We used mood scale BEF-1R (Kuhl & Kazén, 1994; Experiment 1) and Ostracism questionnaire (Williams et al., 2002, for

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<sup>11</sup> Under the supervision of Maurice Grinberg and together with our associates (Stevan Tomik and Konstantin Dzekov) from the New Bulgarian University (Grinberg et al., 2014), department Cognitive science

<sup>12</sup> MATLAB 8.0 and Statistics Toolbox 8.1, The MathWorks, Inc., Natick, Massachusetts, United States.

Experiments 3 and 4) that have not been translated yet in the Bulgarian language. The experiments suggested that the scales of the Ostracism questionnaire in Bulgarian language related significantly to the construct described by Williams (2000). For Experiment 4, we constructed again a new instrument of six stories for mood manipulation that discerned the ostracism experience from another negative event in the same arousal level. The stories may be further used for comparing the concept of social exclusion experience to other negative emotions.

## Author`s Publications

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- Кузмова, Г. (в печат). Нюанси на социалната болка и нарушеното чувство за принадлежност в ситуация на дилема (The Shades of Social Pain and the Impaired Sense of Belonging in a Situation of Dilemma). *Сборник научни доклади: Девета национална конференция на психолозите в България*. Българско списание по психология – 2019 г.
- Кузмова, Г., Гринберг, М. (2017). Сътрудничество в Дилема на затворника след съприживяване на социално отхвърляне (Co-operation in Prisoner`s Dilemma Game after Co-experience of Social Rejection). *Сборник научни доклади: Осма национална конференция на психолозите в България*, 620-636. ISBN 978-619-90965-1-2.
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