What causes bullying?

Master’s thesis

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Annotation

The objective of this master thesis is to design laboratory experiment that would model bullying and to test the effect of selected factors on it. I compare the features and emotions invoked by experiment to those connected to bullying. I study the role bystanders have in bullying, with exploring two reasons why bystanders may choose not to intervene to stop bullying. The first reason is the different social identity of the victim. Bystanders might also tolerate bullying because of the fear of retaliation, as the intervening bystander might expect to become a victim in future. I find that while the different social identity of the victim makes the bystander more likely to tolerate bullying, fear of retaliation has no significant effect on her choice.

Keywords

Bullying, experiment, social identity, repeated games, bystander, fear of retaliation
Declaration

Hereby I declare that this thesis is my original authorial work, which I have worked out on my own. All sources, references, and literature used or excerpted during elaboration of this work are properly cited and listed in complete reference to the due source.

Brno, 10.5.2018

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Bc. Katarína Čellárová
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Introduction

Bullying, defined as the act of oppression, when an imbalance of power, repetition, and intention to harm are present, is a phenomenon old as humanity. The first well-known mention of bullying comes from early Victorian times. Tom Brown’s Schooldays, first published in 1857, contains a famous example of bullying at school: “Very well then; let's roast him,” cried Flashman, and catches hold of Tom by the collar. One or two boys hesitate, but the rest join in” (Hughes, 1822-1896, chapter VIII). Bullying is prevalent also today. According to World Health Organization (Currie et al., 2009) using data from several developed countries, around 30 % students have been bullied at school. Bullying is an important research topic for several reasons. First, it negatively affects educational outcomes at schools (Brown & Taylor, 2008). Second, children victimization is connected with poor social skills and more psychiatric disease in adulthood (Farrington, 1993). Bullying is also interesting because of its relation to crime and other aggressive, antisocial behavior.

Although the majority of people think that bullying process includes just bully and victim, in the last few decades, the role of those not directly involved gets deserved attention. Bystanders, as they are called in literature, play an important role in the beginning and also stopping the bullying. In this act of oppression, they could play different roles, from those, enforcing bully to continue, to those defending the victim. Various studies showed that they could be successful in supporting the victim if they decide to intervene against bully’s behavior (Craig, Pepler & Atlas, 2000). Unfortunately, there are only a few authors dealing with their motivations for these decisions. Majority of the literature on bullying focuses on their actions and correlations with their characteristic. The research is done by self-reporting questionnaires, video records, and peer nominations. Motivations of bystander’s behavior are examined a little.

The main goal of this thesis is to examine the influence of fear of retaliation and social identity on the decisions of bystanders. To estimate the size of the effect on bystander’s behavior, I will design laboratory experiment that incorporates the main defining properties of the bullying process. Contrary to the existing literature that focuses mainly on correlations using observational data, the experimental method allows us to study the causal effect these two factors on decisions of bystanders in a controlled environment. Design of the experiment will have 2 x 2 treatments,
with combining mixed or same social identity among players, and infinite and finite horizon for examining the effect of fear. To assess external validity of my experiment, I will create a questionnaire in which I will ask students about their motivations and feelings after the experiment. This will help me to identify their strategies and study the behavior of bystanders not only from their own perspective but also from the perspective of bullies and victims.

Chapter 1 contains a short survey of the literature on bullying. In Chapter 2 I will introduce the experimental design and state our hypotheses. Chapter 3 presents our data. In this chapter, I will also discuss the motivations and strategies used by subjects retrieved from the questionnaire, or derived from the development of the game. In Chapter 4, I will compare the treatments, test hypotheses, and examine the effects of our factors on various outputs of the experiment.
1 Literature review

Modern research on bullying began in early 70’s, with the publication "Aggression in the Schools" by Olweus (1978), who studied bullies and victims with questionnaires in the school of Stockholm. Nowadays, there is a significant amount of papers and books, dealing with this world-wide problem, from those that study the relationship between the victim and the bully (e.g., Ttofi & Farrington, 2011; Perren & Alsaker, 2006; Crick & Grotaper 1995), to those that evaluate the effectiveness of the prevention programs (e.g., Rodkin et al., 2014; Polanin, Espelage & Pigott, 2012). According to WHO (Currie et al., 2009), bullying is a global problem with an average of 32% of children being bullied across 38 countries/regions.

1.1 Definition

To understand the bullying process, and its effects on the long and short horizon, it is necessary to start with a detailed definition of bullying. According to Farrington, “bullying includes several key elements: physical, verbal, or psychological attack or intimidation that is intended to cause fear, distress, or harm to the victim; an imbalance of power, with the more powerful child oppressing the less powerful one; absence of provocation by the victim; and repeated incidents between the same children over a prolonged period” (Farrington, 1993, p.384). Centrum of disease control and prevention (2011) adds that bully or victim does not have to be just one person, it can be a group of youth, oppressing someone, with the condition that they are not siblings or current dating partners.

1.2 Effects of bullying

Several studies show that it has medium and long-term consequences on many aspects of children’s lives. Brown & Taylor (2008) analyzed data from NCDS British Cohort study with a target sample of children born during one week in 1958. This study collected data from children in particular ages from 7 to age 42, with nearly 9000 participants at the end. After analyzing them, they found significantly lower educational attainment among adults being frequently bullied at school. Bullying influences also present and future health, with victims suffering in young adulthood more psychiatric diseases than their peers. Moreover, this applies not only to oppressed ones but also to bullies, suggests Wolke et al., (2013), after examining self- and
parent-reported bullying in a sample of 1273 participants. Besides health and educational problems, bullying has also impact in the future contribution to the society. Smokowski & Kopasz (2005) discussed in their review of previous research that bullies are more often convinced of crime and have more traffic violations than their less aggressive peers. Victims of bullying carry their personal experience to the adulthood, which leads to intergenerational continuity of bullying (Farrington, 1993). In addition, fear of being bullied can result in victim’s dropping out of school, because of missing days, with long-term consequences in a future life (Sharp, 1995). Childhood victimization is associated with lack of relationships (Takizawa, Maughan & Arsenault, 2014), low self-esteem (O’Moore & Kirkham, 2001), and with poor social skills (Farrington, 1993). Some studies suggest that bullying has long-term continuity, with evidence that bullies from primary school tend to be bullies also at the university (Salmivalli et al.,1996; Lewis, 2004), and they are also more involved in workplace bullying and harassment (Smith et al., 2003).

1.3 The role of bystanders

Although most authors focus on the role of the bully and the victim in the bullying, the role of the bystander is similarly important. Since my thesis focuses on the role of bystander, this section provides a detailed review of the literature on bystanders. In particular, it presents studies that document the importance of bystanders in the bullying process, discusses the role of prevention programs aimed at bystanders and lists of reasons why bystanders choose not to intervene to stop bullying.

To see the effect of a bystander in bullying process, I need to look at the previous research. O’Connell, Pepler & Craig (1999) studied peer interactions that occurred on the school playgrounds. They examined 53 segments of videotapes with bullying incidents among 120 target children and found that in 80 % of incidents peers were involved. In times of beginning research of bystanders, almost all authors agreed that they matter a lot. Twemlow et al. (2004, p. 220) suggested that bullying should be “defined in triadic terms, as an interactive effect between bully, victim, and bystander, in which the responses of each directly affect the harmfulness of the outcome. The bully does not act as an individual, as for example in a private vendetta, but becomes, in part, an agent of the bystanding audience, which fuels the fire, so to speak, and perhaps even intensifies the harm”. This shows that bystanders are a substantial part of the
process, and even in some cases, they are the reason why bully continue. Salmivalli, Voeten & Poskiparta (2011) examined bystanders in questionnaire survey with 6,764 primary school children. They found that bystanders have a big impact on the frequency of bullying in their classroom, and not only when defending victims, but also when reinforcing bullies. Moreover, Craig, Pepler & Atlas (2000), based on their study of video records from school playgrounds suggest that even standing by and observing encourages bully and may be interpreted as approval by him. Research of Lynn Hawkins, Pepler & Craig (2001) with the naturistic observation of 58 children shown that only a few bystanders report bullying, or intervene against it. Potential defending bystanders feel anxiety in a bullying situation, and only little of them dare to do something. However, when they do, there is a 57% of successful intervention, in terms of stopping bullying (Craig, Pepler & Atlas, 2000). It is important to teach children to not only how to defend themselves, but also give them advice what to do if no adult is presented. Since most of the bullying takes place on the playground (O'Connell et al. 1999), and generally in the places with minimal supervision, it is necessary to teach children how to stop bullying actively.

Although their influence on the bullying process is significant, bystanders have different attitudes towards it. Some of them like bullying, some of them feel that it is not right and should not be done, some of them do not care. Rigby and Slee (1991) showed in their study with 717 survey participants that 85% of students not involved in bullying felt that they should do something when one child is abusing other. Besides that, they found that personal characteristic, determine the probability that bystander will intervene. For instance, they found that younger children tend to feel more pro-victim than older. Salmivalli et al. (1996) identified four different roles of bystanders: assistants, reinforcers, outsiders, and defenders. Since assistants and reinforcers support bullying, outsiders and defenders do not like it. In “circle of bullying” Olweus (2001) described each role (see Appendix A). To take an attitude towards this act of oppression is heavy and could be influenced by particular conditions a lot. Nevertheless, the majority of the literature agrees (e.g., Oh & Hazler, 2009; Craig, Pepler & Atlas, 2000) that most bystanders are passive in helping victims.

The literature identifies several reasons why bystanders do not intervene against a bully and do not support victims. In a survey of 3600 children containing possible scenarios of bullying, Gini
et al. (2008) found that bystanders are more likely to be passive witnesses when they believe that the victim is bullied because of her fault.

Next possible reason for bystander not to intervene is a diffused responsibility for what happens. Darley & Latane (1968) wrote that in some circumstances, the norm of intervention could be weakened, resulting in the norm of nonintervention. They conducted an experiment with 61 participants just hearing each other in headphones, to examine how was the probability of seeking help influenced by a number of bystanders. Each of these bystanders was a witness of the epileptic event. There is also much evidence from the criminal field. More people seeing the act of injustice lower probability of reporting it or intervening against it. This result is supported by the numerous experiments verifying the fact that people do not perceive intervention as their personal responsibility in the presence of others (e.g., Darley & Latane, 1968; Moriarty, 1975). This is the reason why many bystanders do not intervene; they simply assume that somebody already took action.

Another reason why bystanders do not intervene could be that they have a relationship with bullies, and this made them to join the bully, or at least not to intervene, even in situations they think they should. One explanation of why bystander becomes a follower of a bully is the concept of relational aggression introduced by Crick and Grotpeter (1995) in their study with peer nominations among 491 children. They suggest that behavior in which the bully threatens friends that she will damage the relationship if they would not follow her should be considered as a form of bullying. This behavior is spread among girls more and also includes the threat of damaging relationship being used as a reason to support the bully. Oh & Hazler (2009) examined self-reports of 298 college students that had witnessed bullying during middle or high school. They found that relationship with victim and bully is a significant predictor of bystander’s behavior. Furthermore, Levine et al. (2002) found that when the victim is seen as a member of the same social group, bystanders are more likely to help her. They asked 92 students of psychology whether they would be willing to intervene in a fight they have seen on video. Levine with colleagues found that when we see injustice happening someone like us, we take things more personally and that we are more likely to admit that we can end the same.

Other motivation for not intervening may be a fear of retaliation. This is very strong and substantial reason for bystanders since a bully is often perceived as a stronger person. Thornberg
et al. (2012) confirm that fear of being victimized as next is a significant factor in decisions about intervening or not. In his interviews with 30 students from an elementary and middle school in the US was this factor very relevant for them in making decisions about intervening. Another reason for bullying in the presence of bystanders is that children do not know, how to intervene. They do not like bullying, but they are afraid they cannot be successful in intervention. Some manual, or guide for children could be quite helpful. Kärnä et al. (2010) in their Internet-based questionnaires filled by 6980 primary school children found that high social anxiety in the classroom is associated with low intervention rate These are all possible motivations that literature gives us. However, there is only a little research that study which one influences bystander the most.

1.4 Measurement

There is a huge amount of literature dealing with studying different types of bullying, from the school bullying (e.g., Olweus, 1978) and workplace bullying (e.g., Lewis, 2002), to the cyberbullying, studied by Smith et al. (2008). The research of the prevalence of bullying is most often done using questionnaires, peer or teacher nominations, or by school records. According to Vivolo-Kantor et al. (2014), the most predominant method used to assess bullying was self-report. However, the reliability of this method is questionable. The truthfulness of respondents is hard to check, with doubts mainly about bully’s and victim’s self-report, wrote Branson & Cornell (2009). Thus peer and teacher nomination and school records are more valid. A new approach to study of bullying brought Coie & Dodge (1991). They created many playgroups of six children that did not know each other, to see how prevalent will bullying become in the new environment. There are various methods done in the research of bullying, and combining them and to look at this oppression from different perspectives would be helpful. However, after comparing matching of various methods, Cornell & Brockenbrough (2004) found very poor correspondence among self-reporting, peer nominations, and teacher nominations of students. The next problem is, that most of the questionnaires are qualitative, with no quantitative measures of bullying. Only a few papers are dealing with bullying process in a quantitative way (e.g., Rodkin e al., 2014; Juvonen et al., 2003). Difference between self-reports and reality is often considerable. O’Connell, Pepler & Craig, (1999) collected data for their study with questionnaires, and then with video records, and found out that students overestimated their willingness to intervene in questionnaires,
compared with the presence of intervention in video records. Most of the questionnaires are concerned to bully or victim, and behavior or motivations of bystander remains marginally studied. Majority of literature is focused on the presence of bystanders and their actual intervention, but only a few authors (e.g., Thornberg et al., 2012; Oh & Hazler, 2009) methodically study motivations and cases when intervention is more likely. The behavior of the bystander is often examined via questionnaire, peer or teacher nomination, or video records. However, his motivations and personal characteristic are examined just a little in comparison with the research of bullies and victims.

1.5 Experiments related to bullying

There are many reasons why to conduct experiments in the study of various events. A well-designed experiment can examine the strength of particular factor, with controlling other possible influential factors. While in questionnaires all observed variables are endogenous, experiment study exogenous influences. Furthermore, by experiment, it is possible to detect causal relations.

Even though there are some experiments studying bystander, all of them deal with the bystander in another situation than bullying. Research of bystanders, in general, started with stabbing to death of Kitty Genovese outside her apartment building in New York in early hours (e.g., Darley & Latane, 1968). With 38 witnesses that saw or heard the attack, and no one calling the police or help, bystander and his behavior became a person of interest among scholars. An experimental study of bystanders in a different context was done for example by Darley & Latane (1968), who examined how a number of people hearing epileptic event influence speed of report that.

As far as I know, this thesis presents the first laboratory experiment studying why bystanders do not intervene if they observe an unfair situation that resembles bullying.

1.6 Group identity

In my experiment, I also study the impact of social identity. Thus a short survey of methods used in inducing social identity in the laboratory will follow.

Social identity theory, developed by Tajfel & Turner (1979), described individual’s self-perception as being derived from group membership. Under this belief, in the intergroup situations, one acts like a member of her own group, with perceiving her group as something
‘superior’, and the other as ‘inferior.’ There is need to say, that these decisions are conditional in presence of other group. Early experiments in psychology provided evidence that individual’s decision making is skewed with in-group bias at the expense of out-group. Billig and Tajfel (1973) found that participants of their experiment preferred members of their group and discriminated members of others, even with word group not used. Participants that had similar taste in comparison of two painters were more trusted. After notion group was introduced to the situation, differences among preferences were even bigger. According to Chen and Li (2009), that measured the effect of group identity in an experiment with 562 participants, altruism among subjects significantly increased in case of in-group matching. They also found higher preferences for reciprocity, less punishing, and higher preferences for efficiency when paired with the in-group member.

Economists have become increasingly interested how group identity influence decisions. In recent years, there have been a number of experiments studying this effect, from those with natural identities that rely on the differences that already are between participants (e.g., Bernhard, Fehr, & Fischbacher, 2006), to those with induced group identity (e.g., Chen & Li, 2009). Since subjects of this thesis are students with very similar personal attributes (school, education, race,...), I will introduce a couple of the experiments with the successful inducement of group belonging.

Chen and Li (2009) used an open chat and categorization to teams as a way of creating a social identity. They categorized their subjects into two non-overlapping groups, and then they have seen set of paintings by Klee and by Kandinsky\(^1\). After that participants got two additional paintings and had to decide, who is the author of each. They could use a chat program to discuss it with members of their group. Then they played simply allocation game and other sequential game with a member of their, and of another team. Chen and Li examined the influence of chat, random categorization and categorization according to aesthetic preferences between Klee and Kandinsky. Only chat increased self-reported attachment to the group. Another way of creating an identity in the laboratory was introduced in 2005 by Levine et al. when participants identified their favorite football team and answers a couple of questions about it. Afterward, on the way to
the hall to the second stage of the experiment, they met a person in a t-shirt of either their favorite team or another football team. This was an actor, pretended he did something to his ankle, and experimenters measured willingness to help of subjects. Differences between willingness to help a person in a t-shirt of the favorite team and other team were statistically significant. Besides categorization and common effort game, Morita and Servátka (2011) used t-shirts of two colors in their experiment with 258 participants, representing belonging to the social group in the laboratory. They found significant differences between in- and out-group investment in the investigating the hold-up problem.

Findings of authors above suggest that social identity influences decision of people a lot. Moreover, we can find differences in behavior even when identity is created artificially in the laboratory, with several ways how to create this group membership.

1 Wassily Kandinsky (1866-1944) was one of the first creators of pure abstraction in modern painting His friend, Paul Klee (1879-1940), was also among the significant modern artists of the twentieth century.
2 Experimental design and hypotheses

In this chapter, I will explain the experimental design, describe subject pool and set hypotheses, which will be tested on the data collected via experiment.

My aim was to create an experiment that would, in important aspects, simulate the bullying process. According to Farrington (1993) main four attributes of bullying are these:

- physical, verbal, or psychological attack or intimidation that is intended to cause fear, distress, or harm to the victim
- imbalance of power between bully and victim
- the absence of provocation by the victim
- repeated over a period of time

To satisfy all four points above, I designed experiments where three players play a repeated game that models bullying. Thanks to assigning roles at the beginning of the game, I can create a situation where one player has a power to get from one of other two players his money. Therefore, I can raise imbalance of powers with one player stronger on one side, and one weaker on other. However, it is important that weaker player has no impact on his situation. Leading player with more power causes him distress regarding decreasing his utility that a weaker player could have from the experiment. Using the money in terms of manipulating utility of subjects is common in experimental literature (e.g., Becker et al.,1964; Rottenstreich, 2001). This situation is repeated over time; leading player is again capable of getting money from the powerless player. To see the behavior of bystander, I added the third player, who sees what is happening and has an option to intervene against the leading player. The whole procedure is described in the next subchapter.

2.1 General experimental setup

At the beginning of the experiment, participants are randomly assigned to a computer. A distinctive jersey was prepared in front of the computer, either green or blue colored. By assigning them to a computer with jersey prepared in front of, subjects were also randomly divided into two teams, called Green Team and Blue team. Firstly, I asked them to put the jersey
on and to select from what team they are, according to the color. Blue and green were picked because according to research (e.g., Naz, K., 2004; Elliot & Meier, 2014), both of them elicited mainly positive emotional responses, and their effect on emotions is similar – both are perceived as calm, harmonic, and peaceful. Although blue and green also invoke some negative emotions, using bright colors is more often connected with raising positive ones (Naz, K., 2004).

Our experiment included four treatments – *Same social identity* and *Different social identity X Finite horizon* and *Infinite horizon*. In each treatment, subjects were supposed to participate in two tasks: (1) answering one trivia question and (2) playing a repeated game that modeled bullying. Each treatment was implemented in one session (a between-subject design) when the second task was introduced either as a game with the infinite horizon or with the finite (five) number of periods. Two tasks were realized as follows.

The aim of task 1 was to build the social identity of participants. There are many ways how to do that (e.g., Chen & Li, 2009; Eckel & Grossman, 2005). The main tool to achieve common social identity is to motivate participants to expend effort to achieve a common goal. In my experiment, I used the procedure by Morita and Servátka (2013). In the first task, each subject had to pick correct answer for one trivia question out of five options (For a full list of questions with options see Appendix B). Each participant had another question inside teams, but across teams, a set of questions was same. The reason was that I wanted subjects to have the same difficulty as a group in this task. To answer this question, subjects could use chat programs, which allowed them to help each other. Time limit for this task was 12 minutes, and they could communicate only with the members of their team (i.e., members of the green team have not seen communication of blue team and vice versa). This task was played only at the beginning of experiment, in the first round.

For creating a social identity, I have used three tools: categorization of subjects (Blue Team and Green Team), symbol usage (jerseys) and cooperation to achieve a common goal (answering question).

In the instruction to task 1, participants were told they would get 30 CZK for a correct answer, but they will find out the result of this part at the end of the experiment.

After completing task 1, subjects had read instructions for part 2, which was supposed to model bullying. This part was framed neutrally, with no usage of words anyhow related to bullying. At
the beginning of part 2, subjects were randomly assigned to a group, which consisted of three players. Each player was randomly given a role - Leader, Player 1 and Player 2. In the Same social identity treatments, all three players were the members of same teams, so there were either blue or green triplets. In the Different social identity treatments, Player 1 and Player 2 were members of a different team, and Leader randomly assigned to them. Thus there were triplets where Leader and one of the players were from one team, and the other player was from another team. Subjects were informed that they would not know who are players in the triplet, but they will know members of what team, green or blue, they are. In the design with infinite horizon, there were 10 periods played with certainty, and afterward, every next period was the last with the chance of 10%. In the Different social identity treatment 17 rounds were played, in Same social identity treatment, it was 19 periods. In the finite design, subjects went through 5 periods with certainty with notification that next round is last before the fifth period. Subjects in triplets and roles assigned to participants stayed for each period in task 2 the same.

At the beginning of every period, each player was endowed with 100 CZK. Every period had two stages. In the first one, the leader chooses one of the players. Chosen player is named Player X, the other one (that was not chosen) is called Player Y. In the same stage, the leader chooses x and thus decides on the distribution of money between him and player X. In the second stage, player Y will see possible scenarios of the game. He decides whether he wants to intervene in leader’s decision. If he intervenes, all three will have 100 CZK. If he does not intervene, the leader will get 100 + x CZK, player X will get 100 – x CZK, and player Y will get 100 CZK. Payoffs in all situations are shown in table 1:

<table>
<thead>
<tr>
<th>Situation</th>
<th>Leader’s Payoff</th>
<th>Player Y’s Payoff</th>
<th>Player X’s Payoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Player Y will intervene</td>
<td>100 CZK</td>
<td>100 CZK</td>
<td>100 CZK</td>
</tr>
<tr>
<td>Player Y will NOT intervene</td>
<td>100 + x CZK</td>
<td>100 CZK</td>
<td>100 - x CZK</td>
</tr>
</tbody>
</table>

After two stages, subjects can see results of leader’s and player Y’s decisions. From the second period, history box with results of all previous periods is shown in both deciding stages and in results stage too. The game is for all periods the same. The leader again chooses player X and
value $x$. Player Y again has to decide whether he wants to intervene. For a better idea, the process of one round is shown in figure 1:

![Figure 1: Task 2, a process in one period](image)

To foster the understanding of the instructions in task 2, before starting, there was a set of three control questions (see Appendix C). All of the subjects had to answer them correctly before proceeding to task 2.

After all periods were over, there was a questionnaire about feelings and strategies in task 2 (see Appendix D). After completing it, participants could see a screen with their final payoffs.

In the sessions with infinite horizon, the payoff of subjects was a sum of show up fee for participation (50 CZK), payoff from one randomly picked period from those, that are played with certainty (1-10), and the payoff from the last period. In the shorter session with 5 periods, payoff consisted of payoff from one randomly chosen period. Longer sessions took about 90 minutes, shorter one 30 minutes. Because of short duration in the finite horizon design, I decided not to recruit subjects for this experiment only. Instead, I added our experiment to another experiment,
which was realized in the MUEEL lab at that time. After finishing the first experiment, subjects were given jerseys, and the whole procedure was as before. Instructions were slightly different, but all other features stayed the same, as in design with infinite horizon. Experiment, to that I added our experiment, was modeling the Dutch auction. Since process on the beginning was same (recruiting via hroot (Bock, 2014), random assigning to a computer at the beginning of the session), it is possible to say, that conditions for participants were very similar. Dutch auctions took 60 minutes, with my experiment subjects had spent in the laboratory in total 90 minutes, as well as it was in infinite horizon setting. Participants did not know anything about their payoffs from the first experiment, so they were not influenced by earning enough money at the moment when our experiment started. The experimenter told the subjects, that second experiment has nothing common with the first experiment, and that they will be given instructions for this part.

2.2 Hypotheses

The experiment was designed to test several hypotheses. When looking only on the second part of the experiment, without regarding social identity, I could think about a couple of possible situations that could happen. Being in the role of leader, it seems that rules are simple, he needs to pick one player as player X and value of x. Since this game is repeated, if player Y will intervene, he can pick him as player X in next period. Being player Y is more difficult, but it looks like it does not matter what is his choice because in every case, he will get 100 CZK. Knowing that this will repeat, for him is much safer not intervening, as leader’s choice should be the same next round. From the game-theory perspective, each round of the second task is a sequential game, when the first mover is the leader, and the second is player Y. Since player Y always get the same payoff (100 CZK), he should be indifferent between intervening and not intervening. With the repeating of periods, he has lower motivation to intervene, because of the fear that he could be chosen as player X in the next round. In the context of relational aggression by Crick & Grotpeter (1995), player Y becomes the victim in the repeated rounds, as a relationship between him and leader can force him not to intervene. Player X cannot influence the game at all; he sees only results of each round. In our game, leader represents bully, player X victim, and player Y bystander.
Hypothesis 1: *In the different social identity setting bystanders will intervene in a lower share of periods.*

In the different social identity treatments, leader and one of the players are from the same team, while one player is from another team. Thanks to social identity built in task 1, I assume that leader will pick more a player from a different team as player X. Therefore, player Y will be from the same team as the leader and his willingness to accept leader's decision to get money from another team will be larger than in the same team setting, where the whole triplet is the same color. In that case, player Y will intervene against taking money from his team. The other assumption leading us to this hypothesis is that in different-team setting player 1 is from another team as player 2. Therefore they care less about each other. According to literature (Oh & Hazler, 2009), bystander is more likely to intervene if she has a relationship with the victim. In contrary, she supports bully if there are relations between them (Crick and Grotpeter, 1995).

Hypothesis 2: *In the different social identity setting, in cases when a leader will choose x > 0, and player Y will not intervene, the amount taken (x) will be larger than in the same social identity setting.*

A situation when x > 0 and player Y did not intervene, is disadvantageous for player X. He has less money than others and does not influence his payoff. I can say, that bullying has occurred. In the presence of social identity built in task 1, I can assume that there are some relationships between players. According to the literature (Yamagishi & Kiyonari, 2000; Tanis & Postmes, 2005), people tend to trust others in the same social group more. They also care more about others in the same group and are more averse to inequality in their group rather than in other (Klor & Shayo, 2010). I suppose that this is the reason why in same colors treatments, players 1 and 2 will trust each other more, and thus they will intervene more. Assuming that one of the motivations of player Y to not intervene is that he has a fear of being chosen in next round, I suppose that there will be cases when bullying arises in both settings, same and also different colors. However, its size (measured by x) will be lower in the same colors setting in comparison with a different colors setting.
Hypothesis 3: *Players Y will intervene in a larger proportion of the last periods in the finitely repeated game than in the game with an uncertain number of periods.*

Motivation by fear of being chosen next round disappears at the moment subjects know that period they are playing is last. In the finite setting, subjects had a screen with this information at the beginning of last period. Therefore, since player Y is indifferent between intervening or not, he can decide without any consequences of his choice to the next round. Furthermore, with the assumption of inequality aversion, player Y has strong motivation to intervene.

Hypothesis 4: *In the different social identity setting, in a situation when player Y will not intervene, it is more likely that player X will be from the different team.*

In setting with different colors of a jersey in the triplet, distribution of them is always the same: player 1 and player 2 are from different teams, and leader is from one of these teams. Thus they are in a situation, where a leader and one of the players is from one team, and the third player is from different. I suppose for leader and player, that are from the same team is easier to cooperate, even without communication. With the assumption of social identity presence, it is more probable that leader will choose player X from a different team, and that player Y will be more willing to let leader doing whatever he will want.

Hypotheses 1, 2 and 3 compare decision making in one treatment in comparison with another. Hypothesis 4 deals with behavior arisen during different-colors treatment.
3 Data

In this chapter, I will look at the similarity of our game with real bullying. I will evaluate the efficiency of game, the behavior of participants being in particular roles, their feelings, attitudes, and motivations. I will compute some of the basic statistics to have a picture, about how much subjects perceive our game as bullying. Additionally, I will find out what were main strategies in each position, and what were advantages and disadvantages of it. After, I will compare feelings and emotions in positions with those described in literature studying bullying in schools. All data analysis is performed by using program R (Team R, 2017).

3.1 Subjects pool

The lab experiment took place at Masaryk University Experimental Economics Laboratory (MUEEL), at the faculty of Economics and administration in Brno with 96 undergraduate students served as subjects, with 41 men and 55 women. 34.3% of them had Slovak nationality, one student was another nationality, and the rest was Czech citizens. The range of age was from 18 to 26 years, with median 22 years. Almost 2/3 of participants (57) are students of faculty of economics, 13 are from another university, and the rest is equally distributed among other faculties of Masaryk University. There is 54.2% of students that have some work experience, with a median of 2 years working. In four sessions of the experiment, each session was attended by 24 participants. Every participant could attend just one session, because of the same process of experiments. Table 2 presents a summary of treatments and number of participants.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Different colors, Infinite horizon</td>
<td>24 (54.17 % female)</td>
</tr>
<tr>
<td>Same colors, Infinite horizon</td>
<td>24 (66.67 % female)</td>
</tr>
<tr>
<td>Different colors, Finite horizon</td>
<td>24 (62.50 % female)</td>
</tr>
<tr>
<td>Same colors, Finite horizon</td>
<td>24 (45.83 % female)</td>
</tr>
</tbody>
</table>
Participants were recruited via Hamburg registration and organization online tool – hroot (Bock, 2014). The experiment was programmed and conducted using the software z-Tree. (Fischbacher, 2007).

3.2 Questionnaire at the end of the second task

After subjects finished task 2, that modeled process of bullying, I let them fill a short questionnaire about their feelings and motivations in this part of the experiment. The purpose of this questionnaire was to find out emotions and feelings of participants and to see if I was able to rise similarity with real bullying. The questionnaire had 8 questions, with a few variations for different roles of players. For a whole list of questions, see Appendix D. I picked some of the questions from literature dealing with bullying, which measures bullying through questionnaires (e.g., Menesini, E., 2003; Ttofi M. and Farrington, D. 2008; Einarsen et al., 2009; Cowie et al., 2002). Other questions were fitted to find out strategies and motivations subjects used in our game. Seven out of eight questions were opened, so I got data, that I am not able to analyze statistically. That was the reason why I coded answers in the following way: Some are already measurable. Another, with yes/no answers, are easy to categorize, with 1 if the answer was yes, and 0 if the answer was no. However, answers to some questions are a bit difficult to code. I asked subjects about their feelings and emotions, and about strategies and motivations in task 2. I was interested if we can invoke emotions similar to that caused by bullying. There is a huge amount of literature dealing with measurement of emotions (Scherer R., 2005, Richins M., 1997). I decided to divide these emotions and feelings into three categories – positive, negative and neutral. For categorization, I used a scale developed by Russel (1983, p. 1282). Questions which were exploring motivations and strategies of the behavior were coded in following way: I used the most often answers to create categories. For example, player Y’s motivations not to intervene were coded into these categories: fear of being chosen in next round, reciprocity with another player, the leader is from the same team, and also answer that player Y intervened always. For leader’s strategies in picking player X and amount x, we created three categories: random choosing (or rotating choice), same team and regarding what happened in the previous round. The last question in the questionnaire was if subjects think that this game modeled some social or economic situation. The purpose of this question was to find out if participants will find out what was an experiment about.
3.3 Descriptive statistic

Every treatment was attended by 24 participants what means 8 triplets in each. In the all treatments participated together 32 triplets, which is 32 independent observations. To see if bullying occurred, and what happened in all four sessions, new variables were made. I will call bullying a state when the leader will pick x greater than zero, and player Y does not intervene. Therefore, new variable bullying was derived, equal to 1 when conditions above are fulfilled, and 0 if not. In a whole experiment, the sum of cases when bullying was successful is 87 out of 368 possible cases. That means in 23.64% of the experiment; there was a situation, where payoff of player X was under 100 CZK. Beside that I needed to find out the size of discomfort for player X, that is measured as x, that was taken from him. Figure 2 shows the difference between the mean of x suggested by the leader and mean of x actually taken (counted on an individual level):

![Figure 2: Mean of x suggested (individual level)](image)

There was just one leader that did not want to get anything and chose x equal zero all the time. Most of the means of leader’s suggested x were from the range 20-60 CZK. There are also three leaders that suggested 100 CZK as x all the time. X accepted was slightly higher, in three groups, every time (when bullying=1) leader got everything. Then there are 3 leaders with average taken about 25 CZK, two with the average taken 10 CZK. There were three leaders that were capable to take maximum every time bullying was successful (1, 4, and 12 times) in their groups, and bystanders did not intervene. In the whole experiment, mean of x taken, and accepted by a
bystander was 57.89 CZK. It is quite a high number if we consider that maximum possible choice of x was 100 CZK. This suggests that on average when bullying was successful, the leader took almost 60% of the amount he could. To be fair, the design of my experiment makes leader get some money; it is his job to do that. If we look at the average of x suggested by the leader, it is almost 10 crowns less, only 48.25 CZK. It is possible that this statistic is skewed with cases when x was zero. However, if I compute mean of non-zero x, it is 52.84 CZK, so still under x that was taken. From this, I can conclude, that leader was not a bad guy in general, on average he wanted to take half of the possible amount. However, there is need to note that these numbers are derived from all decisions of all leaders, and since in treatments number of periods played was not the same, these statistics are influenced by the length of sessions. More interesting is that all of this happened with the quiet agreement of third player, player Y. Player Y represents in my game person not directly involved in bullying process, but according to Twemlow & Fonagy (2004) very important part of it. In the experiment I designed, he is a witness of the situation and has the opportunity to intervene against it. However, he is not just capable of intervening; he has to decide not to intervene if he does not want to. The moment when he clicks on the button “I do not want to intervene” could be considered an act when he changes from disengaged onlooker to the person who supports bullying. It follows that player Y must have really strong motivation to accept distribution that is on average so bad for player X. To have a whole picture, we should also look at the average of x, that was suggested, nevertheless not taken. Average of x, against which player Y intervened, was 51.08 CZK (with cases x=0 excluded). Sum of cases when leader selected x equal to zero was 32. Descriptive statistics of variations of x are in table 3:

Table 3: Summary statistics of x chosen by the leader

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>mean</th>
<th>sd</th>
<th>median</th>
<th>min</th>
<th>max</th>
</tr>
</thead>
<tbody>
<tr>
<td>x accepted</td>
<td>87</td>
<td>57.89</td>
<td>34.75</td>
<td>62</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>x suggested (x = 0 incl.)</td>
<td>368</td>
<td>48.25</td>
<td>37.98</td>
<td>40.5</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>x suggested (x = 0 excl.)</td>
<td>336</td>
<td>52.84</td>
<td>36.57</td>
<td>50</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>x rejected (x = 0 excl.)</td>
<td>249</td>
<td>51.08</td>
<td>37.09</td>
<td>50</td>
<td>1</td>
<td>100</td>
</tr>
</tbody>
</table>

So the question is, what was main motivation of player Y not to intervene? To find out, we need to look at data from the questionnaire. I asked players 1 and 2 if they were in the situation they
were player Y and did not intervene even when x was above zero. Image 3 shows the distribution of answers with the category “never been in this situation” excluded.

![Motivation not to intervene](image)

**Figure 3:** Player Y’s motivations for nonintervention

Most of them answered that they were not in such situation. From those that agreed that it happened to them, 11 wrote that they wanted to be in favor with leader, so they would not be chosen as player X in next round. Unnever & Cornell (2003), reported that fear of being bullied is often the reason why bystanders do not seek adult help. 5 players wrote that they wanted to punish the second player for not intervening in previous rounds (reciprocity). Last motivation was that leader was from the same team (this refers to treatments with different colors of jerseys in triplet), admitted by 3 players. More than half of players (43 out of 64, 67.19%) states that they were never in a situation that they did not intervene in case x was over zero, with 3 subjects dishonest in this answer. To see if this dishonesty was intentional, I computed how many times player Y that is claiming intervention always did not intervene, and there were at most 2 cases of this situation. Therefore, I conclude that this inconsistency was caused by mistake. It seems like the greatest motivation for player Y to let leader get non-zero x is fear of being chosen next round. A person that is in this role can feel relief that he is not chosen as player X. However, with this role comes responsibility, and in some cases hard decisions too. Answer of many subjects to the question about their feelings in this position is that they were mixed. They experienced confusion and hesitated a lot if they should let leader do what he wants, or risk that their altruistic behavior will lead to an uncomfortable position for them. According to Rigby & Slee (1993), bystanders often feel anxiety and insecurity, and this happened in our experiment too. We can see this confusion and hesitation when we look at the time that took player Y to decide. I measured how long it took them to choose one of the options intervening/not
intervening. In comparison with the time that took leader making two decisions (player X and size of x), player Y is more uncertain about his choice, even though he needs to make just one decision. Figure 4 illustrates the difference between leader’s and player Y’s decision time.

![Figure 4: Decision time, leader vs. player Y](image)

Nevertheless, for some subjects being in this role was good, they had a power to decide the whole situation, and some of them admitted they used this power for revenge to the player that did not intervene previously. These answers seem interesting, derived from a questionnaire we gave subjects about their feeling being in this role. However, since a lot of them responded with their strategies and motivations, we were not able to code feelings for further analysis.

Now we look at the behavior of a bully, in our game represented by the role of leader. In reality, his motivations for starting to intimidate someone else is probably a combination of more factors. Since I was interested mainly in reactions of a bystander, I needed to raise leader’s willingness to get someone else’s money. I motivate leader to be a bad guy by rising his payoff with the amount he will get from player X. We already know something about his choice of amount x in a whole experiment. However, since my game is repeated, we can look at how the choice of leader change during a session. The first decision is, which one of players 1 and 2 will be player X. In treatments with different colors, I assume, that it is mostly the one player from another team. To see if leader changed his decision over periods, we need to look at his strategies. Did he choose one player most of the time, or had he change this choice? To answer this question, I computed a
number of cases when leader’s choice of player X was player 1, and when it was player 2. To differ between leader’s choice, I will measure rotating players as the difference between a sum of choice of one player and choice of another player. In cases when it is less than 1, I can say, that leader picked one player versus other equally. I allowed difference to be 1 because of an odd number of periods. Figure 5 displays a choice of leader and bullying and if it aimed at one player, or if it was changing.

![Choice of player X and bullying of player X](image)

*Figure 5: Choice of player X, retrieved from experimental data*

We can see in the graph on the top that situation, when leader chose one player primarily, is much less often than rotating his choice. In the graph on the bottom, there is the distribution of bullying among players, to whom it is aimed more. Here we can see that in cases of successful bullying, it was the same number of triplets where players rotated, and when one player was picked more often. Quite surprising is that some people are not intervening even though leader rotate them. The reason can be that they want to punish a player that did not intervene when they were in a position of player X. I asked leaders what they considered in their decisions of player X in the questionnaire. Most frequent answers were: random choosing or rotating, picking player X from a different team, and considering what happened in the previous period. Distribution of answers is shown in figure 6:
Random picking was the favorite answer of 20 subjects, choice according to previous rounds was done by 3 leaders and picking a player from the different team as player X was the strategy of 9 leaders. This information is interesting; we can check that jersey in treatments with different colors setting worked as motivation at least for the leader. It is a quite high share (56%) if we realize that these treatments number of a leader is 16.

The second choice, which leader had to do was how much money he wants from player X. It is possible, that choice of x was the key to successful bullying. To see how diverse x leader chose, I derived new variable, deviation of x, which measured the deviation of actual x from the mean of x on the subject level in absolute value. I looked on cases when bullying occurred and when not, to see if leader that was successful in his effort and found the level of x against that player did not intervene. Figure 7 illustrates this deviation of x from its mean computed for each player, with distinguishing states when bullying occurs and not. On figure 7 we can see that deviations from mean of subjects are much higher in cases when bullying did not occur than in cases when it was successful. It follows that leader who found the value of x that was player Y willing to accept did not change this value of x a lot. While leaders who did not take anything from players were changing their choice of x quite much (with median 16.64 CZK), leaders that were able to finish their mission were more careful in their decisions (median 6 CZK). We can see differences between states when bullying occurs and when not.
To see how good were leaders in adapting their decision to the evolution of the game, I need to display their decisions about x in every period. Figure 8 shows a choice of x during periods:

Figure 8: Choosing x, deviation from the mean, development through periods
We can see that leaders successful in bullying changed their decision about the value of x less dramatically than those who did not achieve state when their payoff was higher than 100 CZK. The graph in the upper part of the figure shows how much suggested x differs from the mean of each leader. It is interesting that even though we can see some improvements in deviations of leaders that took x without intervention of bystander, other leaders were in their choice of x more inconsistent. They oscillated around mean of their choices much more. The graph on the bottom shows data smoothed with loess method\(^2\).

The last position in the triplet is a role of victim represented by player X. I created this role to cause authentic reactions of other players. In a situation when player Y did not intervene against non-zero x, player X gets a lower payoff than 100 CZK. However, this is not the only reason why he is in really bad position. In this role, participation in the game is restricted to the show of results. Player X cannot change his payoff as he has no power to influence the situation. His only hope is that player Y will be the good one and intervene against the decision of leader. The purpose of this disability of player X is that we wanted to study the behavior of bystander with knowledge that he is the only one that can be a good guy. According to the questionnaire, this was the worst thing on being in the role of player X. Most of the subjects used words as helplessness, or disability to change the situation to describe their feelings in the role of player X. Uncertainty what happens, zero influence, frustration, hope that player Y will help and fear were some of the other feelings. This suggests that our victims experienced similar feeling as real victims, studied by Menesini et al. (2003) and Ortega et al. (2009). To analyze answers to the question studying player X’s feelings I coded them into three categories – positive, negative and neutral. Distribution among subjects shows figure 9. There was no participant with positive feelings in the role of player X. Most of the subjects responded they felt bad and uncomfortable in this position. As I asked both player 1 and 2 this question, I need to differentiate between a player that had less payoff, what means that bullying was successful. Red color indicates players that had less than initial 100 CZK at least in one period.

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\(^2\) Locally weighted polynomial regression, adds smooth curve to a scatter plot.
Feelings of players X were mostly negative, even if they were not in a position with a lower payoff. From 64 subjects, 41 (64%) reported negative feelings; the rest responded they had no or neutral feelings.

To see a comparison of feelings among roles, one of the questions in the questionnaire was what feelings subjects had in general in task 2. Answers were coded in the same way, according to Russel’s categorization (1983, p. 1282) into positive, negative and neutral/mixed.
I differ between positions of subjects as follows: leader, player X with lower payoff than 100 CZK, player Y being in this position more than 50% of all periods, and player X with payoff equal 100 CZK (bullying was not successful).

Both leader and player Y had mostly neutral or mixed feelings. Reading their answers suggest, that even though they were happy to be in the position that should not be costly, they felt responsibility and discomfort because of hard decisions. Besides that, a number of subjects feeling good in the role of leader or player Y is a little bit higher than a number of those who had only negative emotions. Being in the role of player X splits into two categories – either he experiences bullying (regarding taking money from him in the experiment), or is the object of someone’s else intimidation, though being saved by player Y. We could say that first case brings player X to stress, he is exposed to unfair payoff and can do nothing with it. These players (blue color in the graph) experience helplessness and feelings of injustice. This is the reason why the majority of them chose negative feeling as main at the end of the game. Some players in this position (being player X with an at least lower payoff in one period) had good or mixed feelings. I looked at the sum of x that was taken from these subjects during the whole experiment, and all of them lose a most 100 CZK, with one exception. So I can say that even though they experienced a situation when bullying was successful, they did not get negative emotions from it. The second case, when a player could be categorized as player X was when he was chosen as X more than 50% of the time, but every period he had the payoff of 100 CZK, and bullying did not occur. Participants from this category felt mostly positive emotions, and we assume, that it is because someone stood behind them every time they were chosen. There is also a small number of subjects that experienced the negative or mixed feeling; I assume that the reason is a character of the role of player X.

To sum up, results above suggest that our game is similar to bullying quite enough. The last question in my questionnaire was if subjects think that experiment was similar to some economic or social situation, and if yes, to which one. Since this was opened question too, I coded answers in following way: if subject responded that it was bullying, I coded it as 1. It is obvious that many students had no idea about the purpose of the game, I expected that because of the neutral language of the whole experiment. If answer met at least one of main features of bullying from the definition in chapter 1, I coded it as 1, and 0 if not. Figure 11 shows the distribution of
bullying or similar and something else answers among participants. From 96 subjects in my experiment 23 (23.96 %) responded that they think it is bullying, discrimination, power imbalance, or something else that met criteria we specified. Although I found out what type of player they were during the experiment (leader, player Y or player X, according to % of time they were in this position), this did not play a role in answering this question.

![Figure 11: Similarity to bullying according to participants](image)

Figure 11: Similarity to bullying according to participants
4 Results

In this chapter, I will compare results of experiment across treatments. I will look at the behavior of subjects in different settings. Then I will validate hypotheses specified in chapter 2 by selected statistical test and will derive some models that will describe data from the experiment.

To see differences among treatments, I created some measures of bullying on the group and session level, and also on a period level. Since the game was repeatedly played, there was a need to measure how much of time bystander intervenes, and how strong bullying was (measured by x taken) in case of non-intervention. To see differences between treatments, I derived average characteristics for each group in each session. The presence of bullying and its duration is measured as a sum of rounds when bullying has occurred (variable bullying = 1), divided by a number of rounds that were played. This variable was derived for each group in each session, to see what percentage of time bystander did not intervene. To know how big inequality was bystander willing to accept, I developed variable measures size of x taken during the whole session, divided by a number of rounds when bullying occurred.

Table 4: Summary statistics on a group level

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Different colors, infinite horizon</th>
<th>Same colors, infinite horizon</th>
<th>Different colors, finite horizon</th>
<th>Same colors, finite horizon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of triplets</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Number of triplets bullying</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>occurred at least once</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean % of time bullying occurred</td>
<td>0.32</td>
<td>0.16</td>
<td>0.35</td>
<td>0.1</td>
</tr>
<tr>
<td>Mean of x taken</td>
<td>44.61</td>
<td>13.73</td>
<td>33.06</td>
<td>7.5</td>
</tr>
<tr>
<td>Mean of x suggested by leader</td>
<td>56.77</td>
<td>43.05</td>
<td>52.65</td>
<td>34.62</td>
</tr>
<tr>
<td>Intervention rate</td>
<td>0.63</td>
<td>0.8</td>
<td>0.65</td>
<td>0.68</td>
</tr>
</tbody>
</table>
In other words, this variable tells us an average amount of x taken in one period to one group in the round where bullying occurs. In all summary variables, we can see differences between treatments. In those with triplets of mixed colors, we can see a higher percentage of bullying in one group, and also average x taken in one group is bigger in treatments with different social identity setting. Sum of groups in which bullied occurs is higher, and intervention rate is lower among subjects in different social identity treatments. What is interesting, average x, that suggested leader was higher in this setting too. It seems like a leader in same-colors treatments wanted to take less from player X. In a comparison of horizon settings, there is also less bullying and lower x taken in finite horizon than infinite horizon.

Before statistical analysis, we can look at a similar table, now with measurement of bullying derived on periods level. For each period and each setting, I computed a number of groups when the leader took x above zero and player Y did not intervene (variable bullying = 1). Moreover, for each period average x taken in it was derived as the sum of x taken in the period divided by a number of groups in which bullying was successful. Last two variables deal with what happened in last period. Table 5 presents summary statistics of treatments derived on the period level.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Different colors, infinite horizon</th>
<th>Same colors, infinite horizon</th>
<th>Different colors, finite horizon</th>
<th>Same colors, finite horizon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of groups with successful bullying</td>
<td>2.59</td>
<td>1.32</td>
<td>2.8</td>
<td>0.8</td>
</tr>
<tr>
<td>Average x taken</td>
<td>64.95</td>
<td>40.97</td>
<td>52.6</td>
<td>12</td>
</tr>
<tr>
<td>Number of groups bullied in last period</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Average x taken in last period</td>
<td>76.33</td>
<td>0</td>
<td>75</td>
<td>0</td>
</tr>
</tbody>
</table>

There are some differences between treatment in variables derived on period level too. A count of groups in which bullying occurs is higher in different colors setting, where amount of groups with successful bullying in above 2.5 on one period, unlike the values in same colors setting. Average x taken by those groups in period is also higher in different colors setting. Finally, when
looking on results of last period, we can see, that bystander is less willing to intervene till the end in different social identity treatment, suggesting that among subjects that wore same jerseys in triplets, bystanders stopped being passive sooner. Average x taken in last round gives an illustration of the strength of discomfort situation for player X in cases it continues.

4.1 Hypotheses testing

Hypotheses 1, 2 and 3 deals with the comparison of treatments. Because of small sample size, I need non-parametrical tests for validating hypotheses, as I cannot say if data are normally distributed. Against each of our hypotheses, I will state null hypothesis, and I will find out test characteristic and p-value for this null hypothesis to test if it holds. To make this part clearer, I will identify treatments in this way:

- Different social identity, infinite horizon (T1)
- Same social identity, infinite horizon (T2)
- Different social identity, finite horizon (T3)
- Same social identity, finite horizon (T4)

Hypothesis 1: In the different social identity setting bystanders will intervene in a lower share of periods.

Since I used 2 x 2 experimental design, first I will compare data from different and same social identity setting in the infinite horizon, then in the finite horizon. To test differences between settings, I will use variables derived on a group and period level mentioned above. Bullying rate in group level is counted as the sum of periods when bullying occurs for each group, divided by a number of periods that have been played. In other words, it is a measurement of a share of periods in that bystander did not intervene, even if x was above zero. I compared each reasonable combination of treatments by Mann-Whitney two-sided test. The median difference between the bullying rate in same colors treatment vs. different colors treatment was significantly different from zero for comparison of treatments with the finite horizon (T3 vs. T4, U=48, p=0.079). However, it was not statistically significant for those with the infinite horizon (T1 vs. T2, U=46, p= 0.1299). Comparing the effect of the horizon was made by computing differences with same and different colors setting fixed. Mann-Whitney test showed no differences between finite and infinite horizon not only in same colors setting (T2 vs. T4, U=34, p=0.8358) but also in different
color setting (T1 vs. T3, U=30, p=0.8736). This suggests that horizon has no impact on bullying rate. To check that, I computed mean and standard deviation of bullying rate for each horizon.

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finite (T3+T4)</td>
<td>0.225</td>
<td>0.282</td>
</tr>
<tr>
<td>Infinite (T1+T2)</td>
<td>0.244</td>
<td>0.327</td>
</tr>
</tbody>
</table>

Table 6: Bullying rate, comparison of the horizon

Similar mean and standard deviation suggest that bystander did not intervened in similar share of periods in a comparison of horizons. Mann-Whitney test supports this theory (T1+T2 (infinite) vs. T3+T4 (finite), U=130, p=0.9518) for comparison of data with different horizon setting. Assuming that horizon does not affect bullying rate I tested the null hypothesis that there is zero difference between the median of bullying rate in different social identity vs. same social identity setting (T1+T3 vs. T2+T4). After testing, we can reject the null hypothesis on the significance level 5% (U=188, p=0.0164). That means there is the difference in share of bystander intervention between treatment with mixed and same triplets. To see, if my claim that bullying rate will be lower in same colors setting is true, I computed mean and standard deviation for these types of treatments (T2+T4 & T1+T3).

<table>
<thead>
<tr>
<th>Social identity</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same (T2+T4)</td>
<td>0.132</td>
<td>0.246</td>
</tr>
<tr>
<td>Different (T1+T3)</td>
<td>0.337</td>
<td>0.322</td>
</tr>
</tbody>
</table>

Table 7: Bullying rate, comparison of social identity

From the table 7, we can see that bullying rate is higher in different social identity setting than in same social identity setting. That means that bystander will intervene in lower share of periods, if triplet is mixed.
Hypothesis 2: *In the different social identity setting, in cases when a leader will choose x > 0, and player Y will not intervene, the amount taken (x) will be larger than in the same social identity setting.*

I will validate the null hypothesis that there is no difference in x taken among treatments. Using Mann-Whitney test on data derived on group level will allow me to do that. I will compare average x taken, that is computed as the sum of x taken in the group divided by a number of periods when bullying occurs in the group. To be sure that I can compare data from treatment with different social identity setting with no respect to horizon setting, I will use Mann-Whitney to see if there is the difference between treatment regarding the horizon, infinite in comparison with finite (T1+T2 vs. T3+T4). With U = 136 and p = 0.7625, we do not reject the hypothesis that there is no difference in x taken between treatments with finite and with infinite horizon. Comparison of treatments with the same social identity setting and different horizons (T2 vs. T4) gives U=32 and p=1, the one with the different social identity setting (T1 vs. T3) gives U=36.5 and p=0.6719. Computing mean and standard deviation of x to test the effect of horizon gives following results:

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finite (T3+T4)</td>
<td>20.3</td>
<td>30.2</td>
</tr>
<tr>
<td>Infinite (T1+T2)</td>
<td>29.2</td>
<td>39.0</td>
</tr>
</tbody>
</table>

Similar mean and standard deviation suggest that x taken is similar in a comparison of the horizon, as it was with bullying rate above. From this, I suggest that horizon has no or small effect on x taken, and I can compare differences between treatment regarding the color setting. Mann-Whitney U, when I compare treatments in terms of social identity (T1+T3 vs. T2+T4) is equal to 199, with p = 0.0044, which means significance on level 1%. Thus we reject null hypothesis that there is no difference in x taken between different and same social identity setting. In a comparison of social identity effect in treatments with the infinite horizon (T1 vs. T2) and with the finite horizon (T3 vs. T4), Mann-Whitney test statistics are 48.5 and 50, and p values are 0.0724 and 0.0496, respectively. To find out if my assumption about the direction of
effect of social identity setting is right, I will compute mean and standard deviation for treatment concerning the social identity.

<table>
<thead>
<tr>
<th>Social identity</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same (T2+T4)</td>
<td>10.6</td>
<td>26.9</td>
</tr>
<tr>
<td>Different (T1+T3)</td>
<td>38.8</td>
<td>36.5</td>
</tr>
</tbody>
</table>

From tests, I conclude that in experiment different social identity in triplets setting increased average x taken. Therefore, hypothesis 2, that size of x taken will be higher in treatments with the different social identity setting, holds.

After testing hypotheses 1 and 2, I can say that different color of t-shirts surely affects not only on bystander’s willingness to intervene but also on the size of x he agrees with. Figure 12 gives an illustration of differences between treatments, comparing bullying rate (share of time with x>0 and bystander nonintervention), and x taken (size of x, when bystander did not intervene).

To test size of the effect of different treatments on bullying, I created a few models, with the horizon and color setting as independent variables (see Table 10). To see how different social
identity influenced the behavior of bystanders, I develop dummy variable \( SI \ dif \ LB \ same \), with a value of 1 when player X was member of a different team (means leader and bystander from same), and 0 otherwise. I estimated models on original data, and also on transformed data we have looked on above. Original data from experiment had following structure: one row for each subject and each period. Due to the big dependence from what happened in previous rounds, I needed to cluster errors on the individual level. I estimated two models based on original data – one when the dependent variable is variable \( bullying \) \((x>0 \ and \ intervention=0)\) and second is \( intervention \) (1 if player Y intervened, 0 otherwise, with no respect to size of \( x \)). Since both dependent variables are either 1 or 0, I decided to use LOGIT model for estimation. Because of using LOGIT, for interpreting coefficient of significant variables I will use odds ratio, computed as \( \exp(\text{coefficient}) \). In the first model, variable \( SI \ different \) (social identity different) is significant on the 5% significance, meaning that treatments with different colors increase 1.21 times the amount of time when bystander did not intervene with \( x \) above zero in one group. The odds of bullying for leader from Slovakia for the time of non-intervention in the group, is 0.75 compared to the Czech leaders. In the second model, intervention is decreased if \( SI \ dif \ LB \ same \) is equal to 1. If player X is from different team, intervention is 0.80 times decreased, compared to the player X being from same team. Since this dummy variable is a subset of variable treatment, whole effect of mixed social identity is sum of these two variables. Since both have negative effect, odds for mixed social identity is even less than 0.80. Bystander nationality other increases probability of intervention 1.38 times, but since there is only one person with other citizenship, we cannot assume anything from it. The leader being Slovak nationality increases intervention 1.25 times, meaning that when in the role of leader was Slovak citizen, bystander intervened more likely. However, since bystander knew nothing about leader’s nationality, we can hardly suppose, that this could be relevant for intervention rate, because bystander is the one deciding about intervention. This result leads to speculations why decisions of Slovak leaders were not accepted. It is possible that these people wanted to get high \( x \), and a bystander was more willing to intervene. Also, it is possible, that they had a bad strategy in choosing player X, or did not want to get any \( x \). This variable is though significant, but not interesting from my view. X suggested by leader has no impact on intervention, neither on bullying.
Table 10: Models, hypotheses 1 and 2

<table>
<thead>
<tr>
<th></th>
<th>Bullying</th>
<th>Intervention</th>
<th>Avg. bullying rate</th>
<th>Avg. x taken</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOGIT (1)</td>
<td>LOGIT (2)</td>
<td>OLS (3)</td>
<td>OLS (4)</td>
</tr>
<tr>
<td>SI different</td>
<td>0.194**</td>
<td>-0.049</td>
<td>0.221**</td>
<td>34.732***</td>
</tr>
<tr>
<td></td>
<td>(0.098)</td>
<td>(0.111)</td>
<td>(0.105)</td>
<td>(11.416)</td>
</tr>
<tr>
<td>SI diff LB same</td>
<td></td>
<td>-0.218**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.099)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizon infinite</td>
<td>0.041</td>
<td>0.031</td>
<td>0.051</td>
<td>12.987</td>
</tr>
<tr>
<td></td>
<td>(0.091)</td>
<td>(0.110)</td>
<td>(0.103)</td>
<td>(11.222)</td>
</tr>
<tr>
<td>Leader sex female</td>
<td>-0.003</td>
<td>0.002</td>
<td>-0.067</td>
<td>-26.052**</td>
</tr>
<tr>
<td></td>
<td>(0.102)</td>
<td>(0.110)</td>
<td>(0.116)</td>
<td>(12.567)</td>
</tr>
<tr>
<td>Bystander sex female</td>
<td>-0.066</td>
<td>0.019</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.076)</td>
<td>(0.069)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leader nationality Slovak</td>
<td>-0.280***</td>
<td>0.222**</td>
<td>-0.193*</td>
<td>-6.750</td>
</tr>
<tr>
<td></td>
<td>(0.093)</td>
<td>(0.092)</td>
<td>(0.111)</td>
<td>(12.092)</td>
</tr>
<tr>
<td>Bystander nationality other</td>
<td>-0.144</td>
<td>0.325**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.125)</td>
<td>(0.138)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bystander nationality Slovak</td>
<td>0.034</td>
<td>-0.045</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.088)</td>
<td>(0.104)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X suggested</td>
<td>0.002</td>
<td>0.0004</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.151</td>
<td>0.677***</td>
<td>0.204*</td>
<td>20.885*</td>
</tr>
<tr>
<td></td>
<td>(0.133)</td>
<td>(0.143)</td>
<td>(0.111)</td>
<td>(12.034)</td>
</tr>
<tr>
<td>Observations</td>
<td>368</td>
<td>368</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>R²</td>
<td></td>
<td></td>
<td>0.211</td>
<td>0.301</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td></td>
<td></td>
<td>0.094</td>
<td>0.197</td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-176.847</td>
<td>-207.083</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Akaike Inf. Crit.</td>
<td>371.695</td>
<td>434.165</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual Std. Error (df = 27)</td>
<td>0.286</td>
<td>31.042</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F Statistic (df = 4; 27)</td>
<td>1.807</td>
<td>2.906**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: (1) & (2) est. with clustered errors on individual level  
*p<0.1; **p<0.05; ***p<0.01
Besides LOGIT models on original data, I estimated two model on our derived data. These derived data are computed in the way explained above. Since both dependent variables are continuous, I estimated models with OLS method. As I could see in the testing of hypothesis, in both models SI different variable is significant on the 5 % level significance for average bullying rate and on the 1 % level significance for average x taken. While bullying rate is increased by 22 %, average x taken is raised by almost 35 CZK. These model support hypotheses 1 and 2 that different color of the jersey will lead to more bullying and higher x.

The second and last statistically significant variable in the model (3) is leader nationality Slovak. Just like in model (2), it has a negative effect on bullying. Due to the key role of the bystander in our game, I am not able to deduce anything from the fact, that Slovak leaders lower bullying rate, just some speculations I mentioned above.

In model (4), that estimates average x taken in group/period, I can see that variable leader sex female has statistical significance on level 5 %. Women in a position of leader took 26 CZK less than male leaders. The reason of this could be again less strategy from female leaders, or less willingness to get money. Other variables, including horizon, and other combinations of nationalities and sex were not statistically significant.

We know that player X being different lowers probability of intervention from the player Y. The question that arises is though, is bullying just player Y’s responsibility in my game, or was a leader also “worse” in treatments with different social identity? Since first round is the only one independent on what happened in previous rounds, I derived the model, that estimates relationship of x suggested in the first period with treatment and horizon. For control, I estimated the same model with control variables sex and nationality (see Table 11). No significant variable influences x suggested in the first horizon. That means we can say nothing about leader’s decisions in a relationship with different social identity and infinite horizon setting. Mann-Whitney test when I compare x suggested in the first period in mixed color setting and same color setting also did not prove significant difference (U=141, p=0.6317).
Table 11: Models, suggested x in first period

<table>
<thead>
<tr>
<th></th>
<th>x</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>SI different</td>
<td>15.095</td>
<td>13.839</td>
</tr>
<tr>
<td></td>
<td>(14.434)</td>
<td>(14.920)</td>
</tr>
<tr>
<td>SI diff. LB same</td>
<td>-22.360</td>
<td>-27.801</td>
</tr>
<tr>
<td></td>
<td>(17.508)</td>
<td>(18.843)</td>
</tr>
<tr>
<td>Horizon infinite</td>
<td>17.460</td>
<td>16.289</td>
</tr>
<tr>
<td></td>
<td>(12.283)</td>
<td>(12.775)</td>
</tr>
<tr>
<td>Leader sex female</td>
<td>14.547</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(14.623)</td>
<td></td>
</tr>
<tr>
<td>Leader nationality Slovak</td>
<td>-2.456</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(14.035)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>43.145***</td>
<td>36.315**</td>
</tr>
<tr>
<td></td>
<td>(10.609)</td>
<td>(13.724)</td>
</tr>
<tr>
<td>Observations</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>R²</td>
<td>0.112</td>
<td>0.147</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.017</td>
<td>-0.017</td>
</tr>
<tr>
<td>Residual Std. Error</td>
<td>34.603 (df = 28)</td>
<td>35.196 (df = 26)</td>
</tr>
<tr>
<td>F Statistic</td>
<td>1.181 (df = 3; 28)</td>
<td>0.898 (df = 5; 26)</td>
</tr>
</tbody>
</table>

Note: *p<0.1; **p<0.05; ***p<0.01

Hypothesis 3: Players Y will intervene in a larger proportion of the last periods in the finitely repeated game than in the game with an uncertain number of periods.

To test this hypothesis, I looked at data from last periods of treatments. To validate a hypothesis about occurring of bullying in last period, I used Fisher exact test, which analyses data from contingency tables. Matrix, on which I will do the test is contingency table when one dimension is bullying occurs or not, and other is horizon finite or infinite. I will test the null hypothesis, that in both finite and infinite horizon proportion of states in which bullying occurs or not is equal. Counts in particular cases are in table 12:
Table 12: Number of bullying in last period

<table>
<thead>
<tr>
<th></th>
<th>Finite horizon</th>
<th>Infinite horizon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bullying occurs</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Bullying does not occur</td>
<td>14</td>
<td>13</td>
</tr>
</tbody>
</table>

Fisher’s exact test gives p-value equal to 1, that means there is no difference between bystander intervention in last period among horizons. As we could see, the horizon does not affect his behavior even in last period. That means that in groups where player Y did not intervene in last period he had another motivation than a fear of being chosen as player X next period. We can look at the difference between social identity settings. Fisher's test that compares the occurrence of bullying in last periods between treatments with another color setting (T1+T3 vs. T2+T4) gives p-value equal 0.043. That means we can reject the hypothesis that there will be no difference in bystander intervention in last period between social identity setting on significance level 5%. In a comparison of bullying occurrence in last periods, I can say, that in treatments with social identity different (T1 and T3) bystander did not intervene even with information about ending the game. The fact, that bullying lasted in treatments with social identity setting different is interesting information. It can mean that in these types of treatments, bullying lasted in groups because of different social identity. To see how was the occurrence of bullying in last period affected by the setting of horizon and colors in the triplet, I created two models, that estimate the relationship between bullying and x taken in last period with different treatment settings (table 13).

Due to the discrete character of variable bullying (1 if it occurs, 0 if not), I used for estimation LOGIT model. X taken is a continuous variable, so I estimated a model with OLS method. Since both variables are unique for each subject and derived from decisions in last period, I did not have to cluster errors.
As we can see in table 13, in both models, variable *SI different* (social identity different) is statistically significant on the level 1 %. While in treatments with different social identity bullying is increased 1.44 time (exp(0.362), odds ratio), x taken is increased by 29 CZK in last period. Second significant variable in the model (2) is *leader sex female*, which decreases x taken in last period by 21.5 CZK, with significance level 5%. Again, as in the models above, with bystander does not have information about leader’s characteristic, the reason for this significance could be different, I discussed it above. Horizon does not affect bullying or its strength again, even in last period. Thus hypothesis 3 that in the finite horizon setting there will be a lower number of successful bullying does not hold.

<table>
<thead>
<tr>
<th></th>
<th>Dependent variable:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bullying last period</td>
<td>X taken</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LOGIT</td>
<td>OLS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td></td>
</tr>
<tr>
<td>SI different</td>
<td>0.362***</td>
<td>29.063***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.125)</td>
<td>(9.481)</td>
<td></td>
</tr>
<tr>
<td>Horizon infinite</td>
<td>0.103</td>
<td>8.937</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.123)</td>
<td>(9.320)</td>
<td></td>
</tr>
<tr>
<td>Leader sex female</td>
<td>-0.200</td>
<td>-21.500**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.137)</td>
<td>(10.437)</td>
<td></td>
</tr>
<tr>
<td>Leader nationality Slovak</td>
<td>-0.122</td>
<td>-10.500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.132)</td>
<td>(10.043)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.099</td>
<td>10.906</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.131)</td>
<td>(9.994)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>32</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.305</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td></td>
<td>0.202</td>
<td></td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-9.085</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Akaike Inf. Crit.</td>
<td>28.169</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual Std. Error</td>
<td>25.782 (df = 27)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F Statistic</td>
<td>2.958** (df = 4; 27)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note:* *p<0.1; **p<0.05; ***p<0.01*
Hypothesis 1, 2 and 3 dealt with a comparison of treatments and its influence on the behavior of our subjects. After validating them, I can say, that different jerseys in the triplet are a successful way to rise bullying, with a significant effect on its strength and continuity.

**Hypothesis 4:** *In the different social identity setting, in a situation when player Y will not intervene, it is more likely that player X will be from the different team.*

Hypothesis 4 deals with treatments with the different social identity setting (T1 and T3). It states that in cases when bullying will be successful, it is more likely that player X will be the one with a different color of the jersey in the triplet. Since in triplets with different social identity there is always one player from another team, I suppose, that leader and the second player will join against him. To validate this hypothesis, I stated null hypothesis, that there is no difference in the proportion of player X with same and different colors in cases when bystander does not intervene with x>0. To check this, I derived for each group proportion of player X from a different team in cases of bystander non-intervention. It is computed as the number of successful bullying with player X being a different color, divided by a number of rounds when bullying occurs (x>0 and bystander not intervening). In other words, it is a measure of the proportion of cases when chosen player was from a different team than a bystander, and he did not intervene, on all cases when bullying occurs. To test if hypothesis 4 holds, I derived null hypothesis, that this rate is less than 0.5, as it would be if player X was chosen randomly, and bystander would intervene randomly. The one-sided Mann-Whitney test shows that we can reject this null hypothesis on 10 % significance level, with U=33 and p=0.0997. To test if it was also more likely that leader chose as player X player from the different team, I derived variable that measures the proportion of suggesting player X from a different team. It is computed as the sum of cases when leader chose player X with different social identity, divided by a number of rounds played in the session. One-sided Mann-Whitney test that compares this rate with 0.5 (as if the leader chose randomly) gives U=108 and p=0.0195, what means that share of cases when leader suggested as player X player from the different team is significantly greater than 50 %. This confirms hypothesis 4, that in different color setting it is more likely that player X will be from a different team when bullying is successful.
4.2 Evolution of bullying

Beside validating hypothesis 3, I found, that in treatments with the different color setting (T1+T3) bullying lasted until last period. Knowing this, I examined how was bullying developed through treatments. Therefore, I derived variables that measure bullying (occurrence and strength) also on the period level.

![Graph showing number of groups with successful bullying](image)

Figure 13: Number of groups with successful bullying, during periods

For each period in each treatment I computed a number of groups where bullying was successful, and also average x taken in the period, that is derived as the sum of x taken in the period divided by a number of groups bullying in this period. In other words, it is average x that was taken in one group in particular period among groups, where x was greater than 0 and player Y did not intervene. Illustration of evolution in treatments displays figure 13.

In treatments with color setting different in the triplet, there are more groups with successful bullying, and it lasts until the final period. When looking on average x taken by the group in the period, and comparing with x suggested by the group in the period, we can see that in treatments
with same social identity setting (blue line) x taken is decreasing, while in treatments with different social identity (red line) it is constant or increasing. X suggested develops very similar.

To see the effect of different settings of treatments, I estimated two models, that describes the relationship between a number of bullying groups and x taken with period increasing. Both models are estimated by method OLS, as both dependent variables are continuous. In a model (1) we can see that there is the significant negative effect of treatment with the same color in the triplet. In both finite and infinite horizon, the increasing period in same color setting lowers a number of groups bullying by 0.5 and 0.09 group, respectively. The effect is not so big, though significant on the level 1%. In a model with dependent variable x taken in periods, there is also the negative effect of setting with same colored triplets. Increasing period in treatment with same social identity and finite horizon (T4) decreases average x taken in the group by 15 CZK, in

Figure 14: X suggested vs. x taken during periods
treatment with same social identity and infinite horizon (T2) it is decreased by 2.6 CZK. Both effects are significant on the level 1%. In treatments with color setting different in the triplet, I did not find a significant effect with increasing period.

Table 14: Models, the evolution of bullying

<table>
<thead>
<tr>
<th></th>
<th>Groups bullying</th>
<th>Avg. x taken</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Period x colors same x finite horizon</td>
<td>-0.533***</td>
<td>-15.098***</td>
</tr>
<tr>
<td></td>
<td>(0.126)</td>
<td>(3.125)</td>
</tr>
<tr>
<td>Period x colors different x finite horizon</td>
<td>0.067</td>
<td>-1.816</td>
</tr>
<tr>
<td></td>
<td>(0.126)</td>
<td>(3.125)</td>
</tr>
<tr>
<td>Period x colors same x infinite horizon</td>
<td>-0.098***</td>
<td>-2.592***</td>
</tr>
<tr>
<td></td>
<td>(0.025)</td>
<td>(0.616)</td>
</tr>
<tr>
<td>Period x colors different x infinite horizon</td>
<td>0.028</td>
<td>0.845</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>(0.702)</td>
</tr>
<tr>
<td>Constant</td>
<td>2.353***</td>
<td>61.359***</td>
</tr>
<tr>
<td></td>
<td>(0.248)</td>
<td>(6.155)</td>
</tr>
</tbody>
</table>

Observations: 46  46

R²: 0.549  0.587

Adjusted R²: 0.505  0.547

Residual Std. Error (df = 41): 0.788  19.550

F Statistic (df = 4; 41): 12.461***  14.592***

Note: *p<0.1; **p<0.05; ***p<0.01
Conclusions

The main goal of this thesis was to examine the influence of fear of retaliation and social identity on the decisions of bystanders in bullying process. To observe behavior, I designed simple repeated game, that modeled this situation, with three players that represented three sides of bullying: bully, victim, and bystander. To test external validity of my experiment, I made a questionnaire that controlled how participants perceived it. I was particularly interested in the behavior of bystander since I believe that he has a big influence bullying process, and in some cases also the power to stop it.

To test the impact of social identity, I induced identity inside the lab and compared how it changed outputs of an experiment in the groups with same and with different identity among players. I found that in conditions of different social identity bystander was less likely to intervene if the victim was from a different team. The setting of experiment with mixed triplets decreased intervention rate significantly. Mixed triplets also increased the strength of bullying, represented by the amount of money that bully was capable to get from the victim, with bystander’s quiet approval in the form of nonintervention. The difference between amount taken from the victim was significant, suggesting that not only bystander was less willing to intervene, but she also led bully to get more.

For examining how fear of revenge affected bystander, I compared her behavior in last period with and without information that this round is last. I found no significant difference between the number of groups where bullying takes place in the last round. There was a similar number of groups in last period with and without knowing this. Thus, I can conclude, that in our experiment fear of retaliation was not determining as the motivation of bystander’s passive behavior.

Looking at the similarity between our game and real bullying, it is possible to say, that game including all main features of this act of oppression is close to this act in reality. I was able to invoke bullying among students that did know each other, just by inducing an artificial social identity. Most of them had similar feelings as victims being her in our game, with bystander’s motivation very close to those suggested by literature. However, I recognize some limitations in the experiment. Using the experimental method in the study of bullying is not often, and I assume
that it is necessary to find how my findings fit into reality. For now, I have little observations for more general conclusions. Even though I found significant differences among treatments, I would try to test my hypotheses on the bigger dataset. The conclusion that fear has no impact could be skewed by experiment that was run before my experiment, with subjects reported tiredness. Thus it is possible, that they could not focus enough. The first move of a bully in my design is a little questionable. Czech phrase “to choose somebody” was perceived by some subjects as something good. They reported they were “choosing their teammate since they believed her.” Better control questions, incentivizing them, or changing choice of the victim to the choice of the bystander could improve understanding among participants. The last limitation, according to answers in questionnaire was that the game was too long. Subjects changed their strategy “so that it is not always monotonous and to mix cards a bit.” This suggests, that in groups with equilibrium made fast participants perceived it as boring and long, and made decisions because of the curiosity what will happen.

Even with some limitations and suggestion what to do better next time, my experiment modeled bullying quite well. My findings revealed the impact of social identity and fear isolated from the influence of other factors. To design successful prevention against bullying, it is necessary to study and know more about the whole process. We need to find out motivations of bystanders, as they are the possible key in the lowering this deviant behavior. When we will know more about what are the main reasons why bystander is uncertain and passive, we will be capable to turn them and to give children knowledge, that they can improve their environment successfully.
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B  Questions about trivia
C  Control questions
D  Questionnaire
E  Instructions
F  Experimental environment

Note: Appendices B – F are in Czech language, as seen by participants of the experiment. For translations to the English language, please contact the author via cellarova.katarina@gmail.com.
A The bullying circle

B Bully/Bullies
Plan and/or start the bullying and take an active part

C Henchmen
Take an active part but do not plan or start the bullying

D Active Supporters
Cheer the bully on and seek social or material gain

E Passive Supporters
Enjoy the bullying but do not show open support

F The Targets
The ones who are bullied

G Potential Witnesses
Oppose the bullying but do not act

H Disengaged Onlookers
Observe; ‘none of my business;’ turn away

An adaptation of The Bullying Circle
by Dan Olweus, PhD
used with permission
B Questions about trivia

- V jaké zemi se Marie Antoinette se narodila jako arcivévodkyně?
  a) Francie b) Itálie c) Polsko d) Německo e) Rakousko

- Ve kterém měste mimo Řecko žije nejvíce řeků na světe?
  a) Toronto b) Melbourne c) New York d) Peking e) Londýn

- O kterém z pěti smyslů se věří, že jej delfíni nemají?
  a) Sluch b) Chuť c) Zrak d) Čich e) Hmat

- Hvězdná noc je olej na plátně namalovaný tímto post-impressionistickým malířem:
  a) Paul Gaugin b) Vincent Van Gogh c) Paul Cézanne d) Claude Monet e) Auguste Rodin

- Jak se jmenuje člověk v Disneyově Malé mořské víle, do kterého se Ariel zamiluje?
  a) Kristoff b) Princ Erik c) John Smith d) Princ Florian e) Princ Filip

- Na jaký hudební nástroj hrál Sherlock Holmes?
  a) Flétna b) Piano c) Buben d) Harfa e) Housle

- Kdo byl nejstarším členem rockové skupiny The Beatles?
  a) John Lennon b) Paul McCartney c) Ringo Starr d) George Harrison e) Stuart Sutcliffe

- V jakém roce byl poprvé představen iPhone?
  a) 2003 b) 2007 c) 2005 d) 2010 e) 2000

- Ve které krajině byl založen nejstarší parlament na světě?
  a) Island b) Velká Británie c) Francie d) Nizozemí e) Izrael

- Kolik planet v naší sluneční soustavě má měsíce?
  a) 2 b) 7 c) 6 d) 4 e) 5

- K tomu, aby mohla být whisky prodávaná pod označením bourbon, musí obsahovat nejméně 51%:
  a) Pšenice b) Kukuřice c) Ječmen d) Žita e) Ovse

- Ve které krajině se konali zimní olympijské hry v roce 1998?
  a) Norsko b) USA c) Rusko d) Japonsko e) Francie
C Control questions

1) V prvním kole si navrhovatel jako hráč X zvolil hráče 2. Je pravda, že hráč 2 bude mít roli hráče X po zbytek experimentu?
   a) Ano  b) Ne

2) Navrhovatel jako hráč X zvolí hráče 1 a hodnotu x. Hráč Y nezasáhne do rozhodnutí navrhovatele. Jaké budou výplaty v pořadí navrhovatel, hráč 1, hráč 2?
   a) 100 Kč, 100 Kč, 100 Kč  b) 100 + x Kč, 100 Kč, 100 – x Kč,
   c) 100 + x Kč, 100 – x Kč, 100 Kč

3) Navrhovatel jako hráč X zvolí hráče 2 a hodnotu x. Hráč Y zasáhne do rozhodnutí navrhovatele. Kdo bude mít nejvyšší výplatu?
   a) Navrhovatel, 100 + x Kč  b) Všichni stejně, 100 Kč  c) Hráč 1, 100 + x Kč
D Questionnaire

[Questions 1 – 4, same for all subjects]

1) Jak náročná se Vám zdála Vaše otázka v první části experimentu? (nenáročné = 1, velmi náročné = 5)
2) Máte pocit, že se Vám snažili členové Vašeho týmu pomoci v chatovacím programe?
3) Jaké pocity ve vás vyvolal vo vývoj druhé části experimentu?
4) Napadlo Vám během experimentu, že byste z něj chtěl(a) odejít? Pokud ano, proč?

[Questions 5-7 for leader]

5) Jaké pocity ve Vás vyvolávala vaše úloha?
6) Na co jste bral(a) ohled při volbě hráče X a při volbě částky x?
7) Myslíte si, že jste nějak ovlivnil(a) náladu hráčů 1 a 2? Pokud ano, jak?

[Questions 5-7 for player 1 and player 2]

5) Jaké pocity jste měl(a), když jste byl(a) hráčem X?
6) Jaké pocity jste měl(a), když jste byl(a) hráčem Y?
7) Stalo se Vám, že jste jako hráč Y nezasáhl(a), i když navrhovatel zvolil nerovné rozdělení peněz? Pokud ano, proč?

[Question 8 same for all subjects]

8) Myslíte si, že je tento experiment podobný některé ekonomické nebo společenské situaci? Pokud ano, které?
**(E) Instructions**

[Instructions in different horizon settings, black = same, blue = infinite, red = finite]

**Úvod Experiment 2**


Budete se rozhodovat samostatně bez komunikace s ostatními účastníky experimentu. Pokud Vás při čtení instrukcí nebo později při samotné hře napadne nějaký dotaz, prosíme, zvedněte ruku a moderátor experimentu k Vám přijde a dotaz zodpoví.

Během celého experimentu nekomunikujte s ostatními účastníky, nepoužívejte mobilní telefon ani jiná elektronická zařízení vyjma počítače, u kterého jste usazení, a věnujte svoji pozornost výhradně experimentu. V případě neuposlechnutí budete vyloučeni z experimentu bez nároku na odměnu.

Před sebou máte rozlišovací dresy s barvou Vašeho týmu, prosím, oblékněte si je. Na základě losování sedadel jste byli náhodně rozděleni do dvou týmů, po celý experiment je budeme nazývat Zelený tým a Modrý tým. Prosím, vyberte na úvodní obrazovce, ke kterému týmu patříte.

Rozdali jsme Vám rozlišovací dresy s barvou Vašeho týmu, prosím, oblékněte si je. Na základě losování sedadel jste byli náhodně rozděleni do dvou týmů, po celý experiment 2 je budeme nazývat Zelený tým a Modrý tým. Prosím, vyberte na úvodní obrazovce, ke kterému týmu patříte.

**Průběh 1. části experimentu**


Prosím, nezjišťujte identitu Vašich spoluhráčů, ani neprozrazujte tu svoji. Rovněž se vyvarujte urážlivých a vulgárních slov. Výstupy z chatového programu můžou být použity při vyhodnocení výsledků experimentu.
Průběh 2. části experimentu

Experiment sestává z náhodného počtu $K$ kol, která budeme označovat kolo 1 až $K$. V každém kole budete řešit stejný rozhodovací problém. Počínaje kolem 11 počítač na konci každého kola se experiment ukončí s pravděpodobností 10 %. To znamená, že počínaje kolem 11 bude každé další kolo následovat s pravděpodobností 90 %.

Experiment sestává z 5 kol.

Experiment bude probíhat v tříčlenných skupinách. To, kdo jsou hráči hrající ve Vaší trojici nebudete mít, budete však na obrazovce vidět jestli jsou ze zeleného, nebo modrého týmu. Na začátku experimentu bude každému členu skupiny náhodně přidělena jedna ze tří rolí: navrhovatel, hráč 1 a hráč 2. Tyto role se během experimentu nebudou měnit. Složení skupin zůstane stejné v rámci celého experimentu.

Průběh experimentu je schematicky znázorněn v následující tabulce:

<table>
<thead>
<tr>
<th>Kola</th>
<th>Spoluhráči</th>
<th>Ukončení</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolo 1</td>
<td>Dva náhodně vybraní spoluhráči</td>
<td>Hraje se s jistotou</td>
</tr>
<tr>
<td>Kolo 2 až 10</td>
<td>Spoluhráči stejně jako v kole 1</td>
<td>Hraje se s jistotou</td>
</tr>
<tr>
<td>Kolo 11 až $K$</td>
<td>Spoluhráči stejně jako v kole 1</td>
<td>Je poslední s pravděpodobností 10 %</td>
</tr>
</tbody>
</table>

Na konci experimentu Vám vyplatíme fixní částku 50 Kč jako kompenzaci za Váš čas na experimentu, jedno náhodně vybrané kolo z kol 1 až 10 a poslední kolo experimentu (kolo $K$).

Na konci experimentu Vám vyplatíme výplatu z jednoho z náhodně vybraných kol 1 až 5.

Průběh kola

Na začátku každého kola dostane každý hráč 100 Kč. Každé kolo má dvě fáze. V první fázi se rozhoduje navrhovatel. Vybírá si hráče 1 nebo hráče 2. Hráče, který byl v tomto kole vybrán, budeme nazývat hráč $X$. Hráče, který nebyl vybrán, budeme nazývat hráč $Y$. Dále navrhovatel volí hodnotu $x$ z rozmezí od 0 do 100 Kč, která rozhodne o rozdělení peněz mezi navrhovatelem a hráčem $X$. V druhé fázi se rozhoduje hráč $Y$, zda chce, nebo nechce zasáhnout do rozdělení peněz zvoleného navrhovatelem. Pokud nezasáhne, dostane navrhovatel 100 + $x$ Kč, hráč $X$ 100 – $x$ Kč a hráč $Y$ 100 Kč. Pokud zasáhne, dostanou všichni částku 100 Kč. Výplaty ve všech možných výsledcích jednoho kola jsou shrnuty v následující tabulce:

<table>
<thead>
<tr>
<th>Volba/Výplata</th>
<th>Navrhovatel</th>
<th>Hráč $Y$</th>
<th>Hráč $X$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hráč $Y$ zasáhne</td>
<td>100 Kč</td>
<td>100 Kč</td>
<td>100 Kč</td>
</tr>
<tr>
<td>Hráč $Y$ nezasáhne</td>
<td>100 + $x$ Kč</td>
<td>100 Kč</td>
<td>100 – $x$ Kč</td>
</tr>
</tbody>
</table>

Poté, co navrhovatel zvolí hráče $X$ a částku $x$ a hráč $Y$ do jeho volby zasáhne nebo nezasáhne, ukážou se všem hráčům kompletní výsledky daného kola, kde budou vidět rozhodnutí jejich spoluhráčů i jejich výplaty za všechna předchozí kola. Rozhodování v každém dalším kole je stejně. Navrhovatel si znovu zvolí jednoho z hráčů jako hráče $X$ a vybere hodnotu $x$. Hráč $Y$ se znovu rozhoduje, zda do volby zasáhne nebo nezasáhne.
Assignment to teams

Prosim, označte, do kterého týmu podle barvy dresu patří:
Zbývající čas:
00 : 26

Vaši odpověď označte prosím kliknutím na ni.

V jaké zemi se Marie Antoinette se narodila jako arcivévodkyně?

- Francie
- Itálie
- Polsko
- Německo
- Rakousko

Chatovací okno

Zprávu napište do dolního řádku, odešlete ji stisknutím tlačítka Enter

Task 1 – Trivia questions & chat
Hraje se kolo 2.

Jste navrhovatel.
Vaším úkolem je zvolit si hráče X a hodnotu x.
Výhry v jednotlivých situacích se zobrazí po Vaší volbě.

<table>
<thead>
<tr>
<th>Situace</th>
<th>Vy</th>
<th>Hráč 1</th>
<th>Hráč 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hráč Y NEZASÁHNE</td>
<td>160 Kč</td>
<td>40 Kč</td>
<td>100 Kč</td>
</tr>
<tr>
<td>Hráč Y ZASÁHNE</td>
<td>100 Kč</td>
<td>100 Kč</td>
<td>100 Kč</td>
</tr>
</tbody>
</table>

Prosim zvolte hráče X:

Hráč 1
Hráč 2

Prosim zvolte x:

0  10  20  30  40  50  60  70  80  90  100

x = 60

Shrnutí minulých kol:

<table>
<thead>
<tr>
<th>Kolo</th>
<th>Hráč X</th>
<th>Hráč Y zasáhl</th>
<th>x</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hráč 1</td>
<td>Ano</td>
<td>50</td>
</tr>
</tbody>
</table>

Task 2 – Leader deciding about player X and size of x
Hraje se kolo 2.
Jste hráč 2.
Navrhnuto si jako hráč X vybral hráče 1 a za x zvolil 60.
Jste tedy hráč Y a máte možnost zasáhnout do rozhodnutí navrhnovatele.
Výpisy v jednotlivých situacích jsou v tabulce.

<table>
<thead>
<tr>
<th>Situace</th>
<th>Výplaty</th>
<th>Vy</th>
<th>Hráč X</th>
<th>Navrhnovatel</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEZASÁHNĚTE</td>
<td>100 Kč</td>
<td>40 Kč</td>
<td>160 Kč</td>
<td></td>
</tr>
<tr>
<td>ZASÁHNĚTE</td>
<td>100 Kč</td>
<td>100 Kč</td>
<td>100 Kč</td>
<td></td>
</tr>
</tbody>
</table>

Chcete zasáhnout?
- Ne
- Ano

<table>
<thead>
<tr>
<th>Kolo</th>
<th>Hráč X</th>
<th>Hráč Y zasáhl</th>
<th>x</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hráč 1</td>
<td>Ano</td>
<td>50</td>
</tr>
</tbody>
</table>
Výsledky kola 2:

Jste navrhovatel.
Za hráče X jste zvollí hráče 1 a za X jste zvollí 60.
Hráč Y nezasáhl.
Výplaty tohoto kola jsou v tabulce:

<table>
<thead>
<tr>
<th>Vý</th>
<th>Hráč 1</th>
<th>Hráč 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>160 Kč</td>
<td>40 Kč</td>
<td>100 Kč</td>
</tr>
</tbody>
</table>

Pokračovat

Shrnutí minulých kol:

<table>
<thead>
<tr>
<th>Kolo</th>
<th>Hráč X</th>
<th>Hráč Y zasáhl</th>
<th>x</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hráč 1</td>
<td>Ano</td>
<td>50</td>
</tr>
</tbody>
</table>