



# That's not fair! unfair treatment spills over into individual risky financial decisions

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## Abstract

Studies indicate that experiencing unfairness may influence subsequent decisions. There is initial evidence that this is also true for gambling decisions made after an experience of unfair treatment in a financial domain. The presented studies test whether this can be extended to other domains of financial risk-taking, such as investments. Moreover, we aim to investigate whether the effects of such experience in one domain generalize to other domains. Three experimental studies were conducted to investigate how unfair treatment coming from varied domains affects individuals' propensities to make risky investment and gambling choices in subsequent tasks. The experience of being a victim or a beneficiary of unfair treatment in financial and non-financial domains was induced and the propensity to take investment and gambling risks was measured. The results of the experiments indicated that the experience of unfairness influences the propensity to make risky financial choices but the domain in which it is experienced plays an important role. Being a victim of financial unfairness makes people more prone to take investment risk and build riskier investing portfolios with more stocks and fewer bonds than when they are beneficiaries or when they are treated fairly. Moreover, being the beneficiary of unfair treatment in a financial domain makes people less prone to choose a sure option (vs risky) in lottery tasks. The abovementioned relationships are exactly the opposite when the experience of (un)fairness comes from a task in a non-financial context. Specifically, the experience of unfair treatment in a non-financial domain leads people to be less prone to make risky investment choices, and it enhances the propensity to build safer investment portfolios with more bonds and fewer stocks than people from the unfair-beneficiary and fair groups. Furthermore, being the beneficiary of unfair treatment in a non-financial context makes people more prone to choose sure option in lottery task.

**Keywords** Unfairness · Victim · Beneficiary · Financial risk · Investment risk · Gambling risk

Willingness to take risk is one of the most important aspects of personal financial decisions. It has been shown that the propensity to make risky decisions is affected by numerous individual variables (Foster et al. 2009; Sekścińska et al. 2016, b; Wong and Carducci 2016) as well as by a range of situational factors (Leith and Baumeister 1996; Massa and Simonov 2006; Sekscinska et al. 2016; Tversky and Kahneman 1981). An inspiring area of research focuses on the way the previous experience of being treated unfairly impacts

subsequent risky decisions. This direction of studies seems to be exceptionally important as the world we live in is characterized by systemic injustice as well as everyday experiences of unfair treatment.

It has been shown that experience of being treated unfairly influences subsequent behaviors and decisions. Not only does it impact interactions with the perpetrator, as the victims tend to respond with unfair treatment in return (Falk and Fischbacher 2006) but also might influence subsequent interactions with new partners as people pass on unfair behavior towards uninvolved third persons (Gray et al. 2014). There are also some studies suggesting that the experience of being a victim of unfair treatment spills over and alters subsequent behavior. For example, Houser et al. (2012) found that the perception of being treated unfairly increases an individual's propensity to cheat. Most importantly, however, it was demonstrated that a feeling of inequality or a personal relative deprivation makes people more likely to gamble and more likely to choose risky financial options (Callan et al. 2011;

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Haisley et al. 2008; Mishra et al. 2015; Payne et al. 2017). Although none of the studies examined the effects of being a victim of unfair treatment directly, they focused on the consequences of states which reflect the lack of fairness in the distribution of outcomes (i.e., distributive fairness; Colquitt et al. 2001). The results of those studies are very suggestive. Nevertheless, we claim that there are at least two reasons why they cannot be generalized to a conclusion that suffering unfairness makes people more prone to take risk.

Firstly, all the studies focused either directly on the tendency to gamble or operationalized the propensity to take risk in such a way that the tendency to choose risky options in gambling tasks was, in fact, investigated. Meanwhile, the propensity to take risk was demonstrated in numerous studies to be highly domain-specific (Hanoch et al. 2006; Slovic 1972; Weber et al. 2002), so the propensity to take risk in a gambling task cannot be generalized to other personal financial risky decisions. Further studies are needed to replicate the results and check whether being treated unfairly affects the propensity to take financial risk in domains other than gambling.

Secondly and perhaps more importantly, money is not the only resource that can be unfairly distributed, and people often experience unfairness in other domains. For example, one can be given a smaller office than co-workers, a less interesting task to complete or less time than others to perform an assignment. At the same time, in the studies conducted so far, the feeling of inequality or personal relative deprivation were induced in a financial area. Subsequently, a propensity to take risk was measured and it also referred to money. As a result, both the experience and the subsequent decision involved the same kind of resources. This generates further reasons for additional studies. In the first place, the experience of being treated unfairly in a financial domain cannot be translated to other areas in which unfair treatment can be experienced, as there are important differences in the way people perceive money and other resources (Lea and Webley 2006). Furthermore, the existing experiments do not allow to determine whether the observed effects of unfairness on the propensity to take risk are genuinely due to the impact of unfair treatment itself. Alternatively, an unfair split of resources or an induced feeling of a personal relative deprivation might lead participants to feel that s/he has less than others and therefore make her/him to be more likely to risk the remaining resources in order to win back. If the first assumption is true, people treated unfairly in other domains should be also more prone to take financial risk compared to those treated fairly. If the second assumption is a case, experience of unfairness in a non-financial domain should not increase the propensity to take financial risk. We assume that a change of experimental conditions resulting in an experience of unfair treatment a non-financial domain and subsequent risky decisions in a financial one will shed more light on the issue of the impact of unfair treatment on decision making.

Concluding, the aim of the studies is twofold. Firstly, we want to provide more evidence to support previous findings indicating that the experience of unfairness makes people more likely to take risk than those who were treated fairly. At the same time, taking into account the domain-specific character of risky choices, we aim to extend the results of the studies conducted so far by verifying whether this kind of experience will also affect domains of financial risk-taking other than gambling. Secondly, we want to check whether an experience of unfairness coming from a domain different than a subsequent decision will yield similar results to the ones obtained in studies in which the experience and the decision were made in the same (financial) domain.

## Literature Overview

### Risk and Individual Financial Decisions – The Role of Domains and Frames

Although risk-taking traditionally has been considered as an individual difference trait that is domain-invariant (Eysenck and Eysenck 1977), further studies demonstrated that the propensity to take risk may also be domain specific (Hanoch et al. 2006; Slovic 1972; Weber et al. 2002). This implies that, apart from their general tendency to take risk, people may be risk-averse in one domain and risk-seeking in another. Following this idea, researchers have conducted studies across a variety of domains of risky decision making. For example, Weber et al. (2002) developed a domain-specific risk-taking scale (DOSPERT) which is used to assess risk-taking across six commonly assessed risk domains. Using this scale, Hanoch et al. (2006) demonstrated that individuals who exhibit a high level of risk-taking behavior in one area (recreational, e.g., bungee jumpers) can exhibit moderate levels of risk-taking behavior in other domains (e.g., financial). Furthermore, Vlaev et al. (2010) demonstrated that even in one domain (e.g., financial) risk preferences might differ depending on the nature of the decision (e.g., gambling, investment, insurance).

Another line of research on situational factors influencing risk preferences focuses on the decision frames. It is important to notice that one can take risk in order to gain something or in order to prevent losing something. Kahneman and Tversky (1979) demonstrated the function of value for gains and losses and argued that people may behave differently depending on whether the outcomes are described in terms of gains or in terms of losses. Numerous studies have confirmed those assumptions by demonstrating that people are more sensitive to losses compared to gains and showing that they are more risk-seeking when the decision involves losses (see meta-analysis: Kühberger 1998; Kühberger et al. 1999).

Abovementioned findings indicate that the propensity to take risk a complex construct. Thus, dispositional as well as contextual factors should be taken into account in the attempts to understand it better.

### The Consequences of Unfair Treatment

Equality is a deep-seated behavioral norm. At default, people split outcomes equally (i.e., 50/50; Messick and Schell 1992). This effect is often demonstrated using a dictator game (DG) or an ultimatum game (UG). During DG, one player decides on a distribution of money (or other goods) that a second player must accept (Guala and Mittone 2010). During UG, one participant offers some portion of the endowed money to the second participant, who can either accept or reject the offer. If the offer is accepted, both players receive money. If the offer is declined, both players receive nothing. According to standard game theory, participants should propose next to nothing and those who are offered the money should always accept it (Guala 2008). However, offers typically average about 30–40% of the total, and a 50–50 split is often observed (Thaler and Camerer 1995).

People are also strongly inequity averse (e.g. Johansson and Svedsäter 2009; Norton and Ariely 2011). During the UG, the majority of responders typically reject unfair offers that give them <20–30% of the total (Camerer and Thaler 1995) irrespective of stake size (Cameron 1999; Munier and Zaharia 2002), cultural background (Henrich et al. 2006), and a multitude of other variables investigated in numerous experiments. As a consequence, they lose any endowment they could have earned. Moreover, people who witness other people being treated unfairly demonstrate a willingness to administer a punishment even when it is costly for them (Henrich et al. 2006) and even if their own economic payoff is unaffected (Fehr and Fischbacher 2004).

It has been demonstrated that violations of fairness can influence related decision making. The victims of unfairness tend to pay back by treating the author of an unfair offer unfairly as well (Falk and Fischbacher 2006). The consequences of unfairness influence not only the author of the unfair offer but can transmit to an innocent third person (Gray et al. 2014; Wu et al. 2015). Furthermore, a handful of studies has shown that unfair treatment affects subsequent, unrelated tasks. Houser et al. (2012) found that the perception of being treated unfairly increases an individual's propensity to cheat. Unfair treatment can also help performance in sport (Axt and Oishi 2016).

### Unfair Treatment and the Propensity to Take Risk

There is also a link between unfairness and the propensity to take risk. In a study by Mishra et al. (2015) participants were manipulated to be victims of inequality, its beneficiaries, or to

have not experienced inequality at all by ostensibly giving a payment for participation in the study to some participants and leaving others without. The victims of inequality engaged in significantly greater risk-taking than other participants. Similarly, Payne et al. (2017) found that higher inequality in the outcomes of a game participants were to play in a laboratory led them to take greater risk in order to achieve greater outcomes. In both studies, the propensity to take risk was measured using a gambling task (i.e. choices between sure and risky options). Other studies show that an experimentally induced feeling of personal relative deprivation (which is perceived as a key individual-level outcome of inequality, see: Smith et al. 2012) translates into gambling urges (Callan et al. 2011; Haisley et al. 2008).

Although none of the studies examined directly the effects of being a victim of unfair treatment, they focused on the lack of fairness in the distribution of outcomes (i.e., distributive fairness; Colquitt et al. 2001). Thus they provide indirect, albeit suggestive, evidence for the link between being a victim of unfair treatment and the propensity to take risk.

### Current Studies

The studies reviewed in the first part of this manuscript indicate that being a victim of an unfair treatment influences subsequent behaviors and decisions. There is a vast literature demonstrating the impact of receiving an unfair offer on decisions in subsequent tasks of the same type (the split of endowed resources). However, it is unclear how being a victim of unfairness affects decisions in unrelated tasks. Nevertheless, there are several studies investigating this issue and their results allow to hypothesize that unfair treatment spills over into individual financial decisions and increases risk-taking. However, further studies are needed in order to verify whether it is possible to claim that there is a link between experiencing an unfair treatment and an increased propensity to take financial risk. Firstly, as mentioned earlier, the result should be extended to other domains of financial risk-taking, for example, investment decisions. Furthermore, given the fact that in previous studies the experience of unfair treatment came from the same domain as subsequent risky choices (a financial one), it should be established whether such experience coming from a different domain impact risky decisions in a similar way. We decided to fill these gaps and conducted studies in which the experience of (un)fairness comes from a task that is of a different nature to the subsequent one and, apart from the propensity to gamble, the propensity to take investment risk is measured.

Furthermore, it has to be noted that fairness can be violated in both the positive (more-than-fair) and negative (less-than-fair) directions. The first situation is not often included in studies on the effect of unfair treatment. In existing studies, people who benefited from an unfair treatment tended to behave in a

similar way to those that experienced fairness (Gray et al. 2014; Mishra et al. 2015). However, taking this issue into account might help to shed some more light on the investigated mechanism. Therefore, we decided to consider both directions of fairness violation in the present experiments.

Moreover, the propensity to take risk in a given domain (e.g. investment or gambling) can be reflected by at least two levels of measurement: a general propensity to take risk in a given domain and choices in specific tasks within this domain. When using a questionnaire measuring a general propensity to take such risk, the score obtained by a participant reflects the result of several choices made in various contexts (for example the tendency to play poker, bet at horse races, etc. in the case of gambling risk). Nevertheless, it does not allow to predict one's choices in a specific situation. For example, if a person likes betting at horse races and is ready to accept a high level of risk in this kind of gamble but dislikes or cannot play poker, the score reflecting his/her general tendency to take risk in a gambling domain will be on an average level, but this does not mean that he/she is ready to accept an average level of risk either when betting at horse races or when playing poker. Hence, apart from using psychometrical scales measuring general tendencies to take risk, we have introduced additional measures – specific tasks – allowing to assess the level of the tendency to take risk in the most important contexts in each domain.

Given the abovementioned gaps in knowledge, we have conducted a set of three experiments investigating the influence of the experience of (un)fair treatment in financial and non-financial areas on the propensity to make risky financial choices in investment and in gambling domains. The studies take into account gain and loss decision frames in gambling tasks. Moreover, two measures of the propensity to take risk in each domain were used to reflect two levels of measurement: a general propensity to take risk in a given domain and choices in specific tasks within this domain.

We predict that the experience of being a victim of financial unfairness will make people more prone to take financial risks in both investing and gambling domains than the experience of being its beneficiary or being treated fairly. As there is not enough empirical evidence to predict the result of non-financial (un)fairness on the propensity to make risky financial choices, we leave it as an open question. Results consistent with those obtained in a financial condition will suggest that the effects obtained in the literature are observed due to the experience of general unfair treatment. Inconsistent results will indicate that the effects observed so far are due to other factors than unfairness and will indicate a direction for further studies.

## Study 1

Study 1 aimed to check whether and how an experience of being treated fairly or being a beneficiary or victim of

unfairness affects the propensity to make risky investment choices and to take gambling risks. The study employed an experimental design.

## Methods

**Participants and Design** A priori power analyses using G\*Power (Faul et al. 2007) revealed that given an alpha of 0.05, a conventionally assumed power of 0.80, a sample of 195 participants would be required to detect the effect of a similar size. We aimed to exceed this number by at least 50%. The study was conducted on a sample of 345 Polish adults via an online panel (170 women, 175 men; age 18–67 years  $M = 42$ ,  $SD = 12.77$ ). All the participants were randomly assigned to one of the experimental conditions (fair:  $n = 109$ ; unfair-beneficiary:  $n = 117$ ; unfair-victim:  $n = 119$ ). An informed consent was obtained from all participants. The study was approved by the Ethics Board of [identifying information removed].

## Materials

**Experience of (Un)Fairness – Experimental Manipulation** The experimental task was prepared for online panelists who are awarded points for each completed survey that may subsequently be exchanged for a range of material goods. There were 3 scenarios prepared for the purpose of the study – one for each experimental condition. The panelists were informed that the Online Panel is currently testing various ways of awarding points for completing surveys and that this time the number of their points will depend on the decision of the other panelist who will divide the amount of 40 points between himself/herself and the participant. In the first scenario (fair experimental condition), the participant was informed that the other panelist divided the points in the proportion 50%/50%, in the second scenario (unfair – victim experimental condition) 30% (for the participant) /70% (for the decision maker), and in the third scenario (unfair – beneficiary experimental condition) in the proportion 70%/30%.<sup>1</sup> As a result,

<sup>1</sup> The proportion of points assigned to the participants and the panelist was chosen after the pilot study ( $N = 42$ ). The participants were firstly asked to imagine that they were the panelist. Then the rules for collecting points in the online panel and exchanging them for the material rewards were described. Then they were presented the experimental scenario with 11 variants for the proportion of points (0%/100%, 10%/90%, 20%/80%, (...), 90%/10%, 100%/0%) assigned to the panelist and the participant and asked to rate to what extent each variant causes him/her to feel that the participant is being treated unfairly by marking the value on a scale from 0 (not at all) to 10 (very strong). The results showed that people perceived a proportion of 50%/50% to be a fair points distribution ( $M_{50/50} = 0$ ). The split 30/70 (unfair beneficiary) or 70%/30% (unfair victim),  $M_{30/70} = 6.02$ ;  $M_{70/30} = 6.79$ , was perceived as unfair (both when the participant was supposed to be a beneficiary and a victim) At the same time, there was no significant difference in perceived level of unfairness between these proportions ( $t(41) = -1.99$ ,  $p > .05$ ). Moreover, there was a significant difference in perceived level of unfairness between the proportions 30%/70% and 50%/50% ( $t(41) = 11.96$ ;  $p < .001$ ) as well as between the proportions 70%/30% and 50%/50% ( $t(41) = 15.38$ ;  $p < .001$ )

participants of the study experienced either fairness or being a victim or a beneficiary of unfair treatment.

**General Propensity to Make Risky Investment and Gambling Choices** The propensity to take risk in gambling and investing domains was measured using two subscales of the DOSPERT scale (Blais and Weber 2006). The DOSPERT scale consists of 30 statements that are related to five different domains of risk namely: ethical; financial/gambling; financial/investing; health/safety, and social. In the present study, only financial/gambling<sup>2</sup> and financial/investing<sup>3</sup> subscales were used. Each of the subscales comprises 3 items (example item: Betting a day's income at the horse races). Participants were asked to indicate the likelihood that they would engage in the described activity or behavior on a scale from 1 (very unlikely) to 7 (very likely). We computed participants' scores in both subscales separately by summing the scores on each of the three items. Therefore each participant's score in each of the domains ranged from 3 to 21.

**Propensity to Make Risky Investment Choices in a Specific Task** The participants were asked to create an investment portfolio by dividing PLN 10,000 (equivalent to approximately \$2,500) between bonds, balanced mutual funds (investing 50% in stock and 50% in bonds), and stock (Sekscinska et al. 2016; Sekścińska et al. 2018a). The task also measured the general riskiness of the created portfolio (riskiness of portfolio) reflected by the percentage of shares in the portfolio (dependent variable). The indicator was based on the following formula:  $0 \times \text{percentage of bonds} + 0.5 \times \text{percentage of mutual funds} + 1 \times \text{percentage of shares}$  (with 0 being the safest portfolio, and 100 the riskiest portfolio).

**Propensity to Make Risky Gambling Choices in the Specific Tasks** This variable was measured using two questions (e.g., Sekścińska et al. 2018b), one in a loss frame and the other in a gain frame.

The participants were asked to choose between a sure option, gaining PLN 1,000 (equivalent to approximately \$270), and an unsure option (a 50% chance of winning PLN 0 and a 50% chance of winning PLN 2,000, equivalent to approximately \$540) in a gain frame and between losing PLN 1,000 for sure and an unsure option (a 50% chance of losing PLN 0 and a 50% chance of losing PLN 2,000) in a loss frame. The questions were formulated in

the same manner as the questions presented by Kahneman and Tversky (1979). We changed the amounts<sup>4</sup> used in the task to make it more appropriate for Polish reality. The expected values of both options in each question were the same (1,000 PLN).

**Procedure** Firstly, the participants took part in an experimental manipulation task. After that the participants completed the tasks measuring their propensity to make risky financial choices in a rotated order. Finally, they provided demographic information. All the materials were administered in Polish. At the end of the study, the participants were fully debriefed. All the participants, regardless experimental conditions, received 40 points for completing the survey.

## Results

Preliminary analyses revealed comparable performance for males and females. Moreover, no relationship between age and the propensity to take risk was observed. Therefore these variables are not discussed further.

### The Experience of (Un)Fairness and the Propensity to Make Risky Investment Choices

**General Propensity to Take Investment Risk** An ANOVA test revealed differences between the three experimental groups (experience of (un)fairness: fair; unfair-beneficiary; unfair-victim) in terms of the propensity to make risky investment choices (DOSPERT financial/investment risk subscale) ( $F[2,342] = 3.76, p < 0.05, \eta^2 = 0.02$ ). The means and *SDs* for each group were: fair group = 8.57 (*SD* = 4.28); unfair-beneficiary group = 8.74 (*SD* = 3.97); unfair-victim group = 9.92 (*SD* = 3.93). Further analysis (planned contrasts) showed that the unfair-victim group presented higher propensity to take financial risk than the unfair-beneficiary group ( $t[342] = 2.28, p < 0.05, \text{Cohen's } d = 0.30$ ) and the fair group ( $t[342] = 2.45, p < 0.05, \text{Cohen's } d = 0.33$ ).

**Propensity to Take Investment Risk in the Specific Task** An ANOVA test revealed differences between the three experimental groups (experience of (un)fairness: fair, unfair-beneficiary, unfair-victim) in terms of the risk level of built investment portfolios ( $F[2,342] = 5.20, p < 0.005, \eta^2 = 0.03$ ). The means and *SDs* for each group were: fair group = 38.51 (*SD* = 27.42); unfair-beneficiary group = 33.09 (*SD* = 22.59);

<sup>2</sup> Cronbach's alpha obtained in the present studies: Study 1:  $\alpha = .835$ ; Study 2:  $\alpha = .832$ ; Study 3:  $\alpha = .853$

<sup>3</sup> Cronbach's alpha obtained in the present studies: Study 1:  $\alpha = .817$ ; Study 2:  $\alpha = .774$ ; Study 3:  $\alpha = .804$

<sup>4</sup> The level of the amount was established on the basis of a pilot study. Polish adults ( $n = 250$ ) were asked to assess different amounts on two scales (1) very small, small, medium, large, very large, and (2) not large enough to be meaningful vs large enough to be meaningful. More than 96% of people described 1,000 PLN as large enough to be meaningful, and at the same time a small or very small amount.

unfair-victim group = 44.00 ( $SD = 27.74$ ). Further analysis (planned contrasts) showed that the unfair-victim group built riskier portfolios than the unfair-beneficiary group ( $t[342] = 3.32, p < 0.001, Cohen's d = 0.43$ ).

Further analysis aimed to check whether the experimental groups differed in the amount of money assigned to the different forms of investments: bonds, mutual funds, and stocks. A 3 (experience of (un)fairness: fair, unfair-beneficiary, unfair-victim – between subjects IV) by 3 (form of investment: bonds, mutual funds, stocks – within subjects IV) mixed-design ANOVA, with the percentage of the amount of money assigned by participants as a dependent variable, was conducted. A significant effect of form of investment was observed ( $F[2,617] = 39.89, p < 0.001, \eta^2 = 0.10$ ). People were prone to spend less money on stocks than on bonds or mutual funds (both  $p < .001$ ). Moreover, participants preferred to spend more money on bonds than on mutual funds ( $p < .01$ ). A significant interaction between the experience of (un)fairness and the form of investment was obtained ( $F[4,617] = 3.00, p < 0.05, \eta^2 = 0.02$ ). Further ANOVA analysis showed that there were significant differences between the groups in terms of their propensity to invest in bonds ( $F[2,342] = 3.13, p < 0.05, \eta^2 = 0.02$ ) and stocks ( $F[2,342] = 6.00, p < 0.005, \eta^2 = 0.03$ ). There were no significant differences observed in the amount of money spent on mutual funds ( $F[2,342] = 0.06, p = 0.94, \eta^2 = .004$ ). Further  $t$ -tests (planned contrasts) revealed that the unfair-victim group allocated less money to bonds ( $t[342] = 2.50, p < 0.05, Cohen's d = 0.34$ ) and more money to stocks ( $t[197] = -3.59, p < 0.001, Cohen's d = 0.47$ ) than the unfair-beneficiary group. The mean percentages of the amount of money assigned to different forms of investment for each of the groups analyzed are presented in Fig. 1.

### The Experience of (Un)Fairness and the Propensity to Make Risky Gambling Choices

**General Propensity to Take Gambling Risk** An ANOVA test did not reveal differences between the three experimental groups (experience of (un)fairness: fair, unfair-beneficiary, unfair-victim) in terms of the propensity to take gambling risk (DOSPERT financial/gambling risk scale) ( $F[2,342] = 0.96, p = 0.39, \eta^2 = 0.01$ ). The means and  $SD$ s for each group were: fair group = 7.48 ( $SD = 4.27$ ); unfair-beneficiary group = 7.57 ( $SD = 4.09$ ); unfair-victim group = 6.89 ( $SD = 4.03$ ).

**Propensity to Take Gambling Risk in the Specific Task** To verify if the experience of (un) fairness influences people's risk preferences in specific tasks in both the gain and loss decision frames, two  $\chi^2$  analyses were conducted.

In the gain frame, the  $\chi^2$  test did not show a significant effect ( $\chi^2(2) = 2.93, p = .23, Cramer's V = 0.09, Table 1$ ).

In the loss frame, the  $\chi^2$  test showed a significant although weak effect ( $\chi^2(2) = 10.45, p = .005, Cramer's V = 0.17, Table 1$ ). The sure option was chosen less often than expected by participants from the unfair-beneficiary group ( $|standardized residual| > 1.96, Table 1$ ).

## Discussion

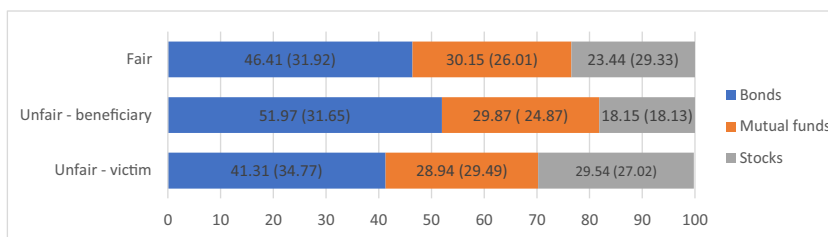
The results of the first study show that the participants from the unfair-victim group had a higher general investment risk-taking propensity and were prone to build riskier investment portfolios with more stocks and fewer bonds than the participants from the unfair-beneficiary group. Moreover, the participants from the unfair-victim group were more prone to take general financial/investing risk than the participants from the fair group. In terms of gambling risk, the effects of unfair treatment were observed only in the scenario with the loss frame of decision. The participants from the unfair-beneficiary group decided to choose the sure option in a lottery less often than was expected. No difference was observed in the DOSPERT financial/gambling subscale score. However, it is important to notice that the scale does not distinguish between the gain and loss decision frames. All the statements refer to situations in which the decision-makers choose between an unsure financial gain or a potential loss of money that was assigned for a given gamble (e.g., poker game). A scenario when a decision-maker faces a choice between a sure loss of his or her own money and can opt for a chance of not losing it at all but risks losing much more at the same time is not included (e.g., tax evasion).

The obtained results seem promising and support our hypothesis. However, there might be an alternative explanation for the observed effects. In Study 1, the number of points that were supposed to be shared between panelists was constant. As a result, the experimental groups differed in the amount of points participants were supposed to obtain for participation in the study. Therefore, the differences in the propensity to take financial risk might have been a result of the different amounts of points the panelists expected to obtain at the end of the study. Although it seems unlikely, we conducted a study to rule out this possibility.

## Study 2

Study 2, analogously to Study 1, aimed to check whether and how the experience of fair and unfair treatment affects the propensity to make risky investment and gambling choices. Study 2 differentiates between the impact of social phenomena – receiving a fair or an unfair split from another person – and the effects of having a larger or smaller endowment,

**Fig. 1** Mean percentages of the amount of money assigned to different forms of investment between experimental groups with SDs in brackets – Study 1



which was not covered in Study 1. Study 2 employed an experimental design.

**Methods**

**Participants and Design** The study was conducted on a sample of Polish adults, via an online panel. Expecting similar effect sizes to Study 1, a total of 324 people took part in the study (156 women, 168 men; age 19–65 years  $M=40$ ,  $SD=12.75$ ). All the participants were randomly assigned to one of the experimental conditions (fair:  $n=109$ ; unfair-beneficiary:  $n=107$ ; unfair-victim:  $n=108$ ). An informed consent was obtained from all participants. The study was approved by the Ethics Board of [identifying information removed].

**Materials**

**Experience of (Un)Fairness – Experimental Manipulation** The scenarios used in Study 2 were very similar to those used in Study 1. They differed only in the amounts of points that were supposed to be divided between the participant and the other panelist and the number of points finally received by the participants, which was constant across conditions. In the fair condition, the panelist divided 40 points taking 20 points for himself/herself and giving 20 points to the participant. In the unfair-beneficiary condition, 29 points were divided, 9 points were assigned to the panelist and 20 points to the participant. In the unfair-victim condition, the panelist divided 67 points,

taking 47 points for himself/herself and assigning 20 points to the participant.

**Propensity to Make Risky Investment and Gambling Choices**

The variables were measured analogously to Study 1.

**Procedure** The procedure of the study was analogous to Study 1.

**Results**

Preliminary analyses revealed comparable performance for males and females. Moreover, no relationship between age and the propensity to take risk was observed. Therefore these variables are not discussed further.

**The Experience of (Un)Fairness and the Propensity to Make Risky Investment Choices**

**General Propensity to Take Investment Risk** The ANOVA test revealed differences between the three experimental groups (experience of (un)fairness: fair, unfair-beneficiary, unfair-victim) in terms of the general propensity to take investment risk (DOSPERT financial/investment risk scale). Significant differences between groups occurred ( $F[2,321]=4.11$ ,  $p<0.05$ ,  $\eta^2=0.03$ ). The means and  $SDs$  for each group were: fair group = 8.58 ( $SD=4.21$ ); unfair-beneficiary group = 9.95 ( $SD=3.81$ ); unfair-victim group = 9.83 ( $SD=3.61$ ). Further analysis (planned contrasts) showed that the fair group

**Table 1** The observed and expected values in lotteries between the experimental groups in gain and loss decision frames – Study 1

	Sure option			Unsure option		
	OC(%)*	EC(%)*	SR*	OC(%)*	EC(%)*	SR*
<b>Gain frame</b>						
Fair group	85(78%)	78.4(72%)	0.8	24(22%)	30.6(28%)	-1.2
Unfair-beneficiary group	81(69%)	84.1(72%)	-0.3	36(31%)	32.9(28%)	0.5
Unfair-victim group	82(69%)	85.5(72%)	-0.4	37(31%)	33.5(28%)	0.6
<b>Loss frame</b>						
Fair group	30(28%)	24.0(22%)	1.2	79 (72%)	85.0(78%)	- 0.6
Unfair-beneficiary group	14(12%)	25.8(22%)	-2.3	103 (88%)	91.2(78%)	1.2
Unfair-victim group	32(27%)	26.2(22%)	1.1	87 (73%)	92.8(78%)	-0.6

\*OC – observed counts; EC – expected counts; SR – standardized residual

presented lower propensity to take financial risk than the unfair-beneficiary group ( $t[321] = 2.58, p < 0.05, \text{Cohen's } d = 0.34$ ) and unfair-victim group ( $t[321] = 2.36, p < 0.05, \text{Cohen's } d = 0.32$ ).

**Propensity to Take Investment Risk in the Specific Task** To analyze the differences between the three experimental groups (experience of (un)fairness: fair, unfair-beneficiary, unfair-victim) in the propensity to make risky investment choices measured as the risk level of the created investment portfolios, a one way ANOVA was conducted ( $F[2,321] = 4.63, p < 0.05, \eta^2 = 0.03$ ). The means for each group were: fair group = 38.71 ( $SD = 24.27$ ); unfair-beneficiary group = 39.50 ( $SD = 24.26$ ); unfair-victim group = 48.35 ( $SD = 26.68$ ). Further analysis (planned contrasts) showed that the unfair-victim group built riskier portfolios than the unfair-beneficiary group ( $t[321] = 2.48, p < 0.05, \text{Cohen's } d = 0.35$ ) and fair group ( $t[321] = 2.68, p < 0.01, \text{Cohen's } d = 0.36$ ).

Further analysis aimed to check whether the experimental groups differed in the amount of money assigned to different forms of investments: bonds, mutual funds, and stocks. A 3 (experience of (un)fairness: fair, unfair-beneficiary, unfair-victim – between subjects IV) by 3 (form of investment: bonds, mutual funds, stocks – within subjects IV) mixed-design analysis of variance (ANOVA), with the amount of money assigned by participants as a dependent variable, was conducted.

A significant effect of the form of investment was observed ( $F[2,580] = 23.42, p < 0.001, \eta^2 = 0.07$ ). Further post-hoc test analyses showed that people were prone to spend more money on bonds than on mutual funds or stocks (both  $p < .001$ ) and more prone to invest money in mutual funds than in stocks ( $p < .005$ ). Moreover, a significant interaction between experience of (un)fairness and form of investment was obtained ( $F[4,580] = 4.43, p < 0.005, \eta^2 = 0.03$ ). The amounts allocated to balanced funds in all groups were similar ( $F[2,321] = 0.11, p = 0.75, \eta^2 < 0.01$ ). However, the groups differed in their propensity to invest in bonds ( $F[2,321] = 5.34, p < 0.05, \eta^2 = 0.03$ ) and stocks ( $F[2,321] = 7.90, p < 0.001, \eta^2 = 0.05$ ). Further planned contrast analyses showed that people from the unfair-victim condition were prone to spend less money on bonds than people from the fair ( $t[210] = 3.21, p < 0.005, \text{Cohen's } d = 0.44$ ) or unfair-beneficiary ( $t[212] = 2.10, p < 0.05, \text{Cohen's } d = 0.29$ ) conditions. Moreover, people from the unfair victim condition were prone to invest more money in stocks than people from the fair ( $t[197] = -3.73, p < 0.001, \text{Cohen's } d = 0.51$ ) or unfair-beneficiary ( $t[201] = -2.54, p < 0.05, \text{Cohen's } d = 0.35$ ) conditions. The mean percentages of the amount of money assigned to the different forms of investment for each of the groups analyzed are presented in Fig. 2.

## The Experience of (Un)Fairness and the Propensity to Take Risky Gambling Choices

**General Propensity to Take Gambling Risk** The ANOVA test did not reveal differences between the three experimental groups (experience of (un)fairness: fair, unfair-beneficiary, unfair-victim) in terms of the propensity to take gambling risk (DOSPERT financial/gambling risk scale) ( $F[2,321] = 0.76, p = 0.47, \eta^2 = 0.01$ ). The means and *SDs* for each group were: fair group = 7.57 ( $SD = 4.67$ ); unfair-beneficiary group = 7.85 ( $SD = 4.37$ ); unfair-victim group = 8.29 ( $SD = 4.04$ ).

**Propensity to Take Gambling Risk in the Specific Task**  $\chi^2$  analyses were then conducted to analyze the differences in propensity to take gambling risk in lottery scenarios with gain and loss decision frames between participants in the three experimental groups. In the gain frame, the  $\chi^2$  test showed a significant effect ( $\chi^2(2) = 6.08, p < .05, \text{Cramer's } V = 0.14$ , Table 2). However, no significant difference between expected and observed values occurred (all |standardized residuals| < 1.96, Table 2). In the loss frame, the  $\chi^2$  test showed a significant although weak effect ( $\chi^2(2) = 14.93, p < .001, \text{Cramer's } V = 0.22$ , Table 2). The sure option was chosen more often than expected by participants from the fair group and less often than expected by people from the unfair-beneficiary group (|standardized residual| > 1.96, Table 2).

## Discussion

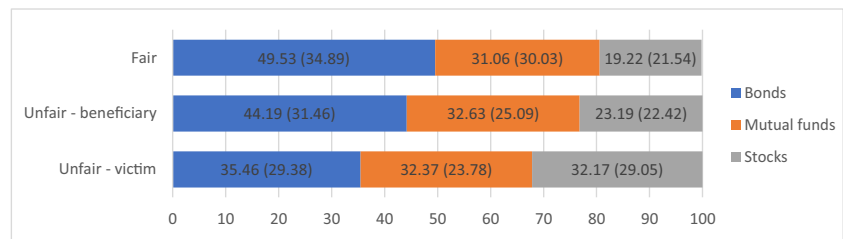
Similarly to the results of Study 1, the results of Study 2 showed that people from the unfair-victim group built riskier portfolios with fewer bonds and more stocks than people from the unfair-beneficiary group and were more prone to take general investment risk than the fair group. Moreover, in Study 2, the participants from the unfair-victim group built riskier portfolios with more stocks and fewer bonds than the participants from the fair group. Furthermore, the participants from the unfair-beneficiary group were more prone to take financial risk as measured by the DOSPERT subscale than the participants from the fair group.

In terms of gambling risk, similarly to Study 1, people from the unfair-beneficiary group decided to choose the sure option in a lottery task in the loss frame less often than was expected. Moreover, in Study 2, people in the fair group chose the sure option in a lottery task in the loss decision frame more often than was expected.

The results of Studies 1 and 2 shed some light on the role of the experience of (un)fairness on people's risk preferences. However, it is not clear if the observed effect is general and also occurs when people experience (un)fairness in a non-financial scenario. We conducted the third study to answer this question.



**Fig. 2** Mean percentages of the amount of money assigned to different forms of investment between experimental groups with SDs in brackets – Study 2



### Study 3

Study 3 aimed to check whether the experience of fair and unfair treatment affects the propensity to make risky investment and gambling choices only when the experience comes from a scenario in the financial domain or whether the effect is more general and may be observed also in a different, non-financial domain.

### Methods

**Participants and Design** The study was conducted on a sample of Polish people via an online panel. Expecting similar effect sizes to Study 1 and Study 2, a total of 339 people took part in the study (161 women, 178 men; age 18–65 years  $M = 41$ ,  $SD = 13.38$ ). All the participants were randomly assigned to one of the experimental conditions (fair:  $n = 104$ ; unfair-beneficiary:  $n = 125$ ; unfair-victim:  $n = 110$ ). An informed consent was obtained from all participants. The study was approved by the Ethics Board of [identifying information removed].

### Materials

**Experience of (Un)Fairness – Experimental Manipulation** The experimental task was prepared for the online panelists. After registration to the online panel, the panelists receive many invitations to take part in various surveys. The number of invitations is much higher than the number of responses, which means that people receive many more invitations than they want to answer. However, not all the surveys are perceived as interesting or pleasurable. Some of them might be viewed as boring or arduous. We can anticipate that the panelists would like to be invited only to the most pleasurable surveys but this is not possible.

There were 3 scenarios prepared for the purpose of the study – one for each experimental condition. In each of them, the panelists (participants of the study) were informed that the Panel has implemented a research project and is currently testing how respondents perceive different ways of assigning surveys to individual panel members. Next, they learned that for this purpose a pool of interesting and pleasant surveys has been selected and will be assigned to panel participants in an unusual way.

Then the participant was informed that he/she was paired with another panelist who had already divided access to the pool of the abovementioned surveys between himself/herself and the participants in a proportion: either 50%/50% (fair) or 30% (for himself/herself)/70% (for the participant) (unfair-beneficiary) or 70%/30%<sup>5</sup> (unfair-victim). As a result, the participants experienced either fairness or were beneficiaries of unfairness or were victims of unfairness.

### Propensity to Make Risky Investment and Gambling Choices

The variables were measured analogously to Studies 1 and 2.

**Procedure** The procedure of the study was analogous to Studies 1 and 2.

### Results

Preliminary analyses revealed comparable performance for males and females. Moreover, no relationship between age and the propensity to take risk was observed. Therefore these variables are not discussed further.

### The Experience of (Un)Fairness and the Propensity to Make Risky Investment Choices

**General Propensity to Take Investment Risk** An ANOVA test revealed significant differences between the three experimental groups (experience of (un)fairness: fair, unfair-beneficiary, unfair-victim) in terms of the propensity to take investment

<sup>5</sup> The proportion of points assigned to the participants and the panelist were chosen following the pilot study. 45 Polish adults took part in a pilot study. They were firstly asked to imagine that they are the panelist. Then they were presented the experimental scenario with 11 variants of possible splits (0%/100%, 10%/90%, 20%/80%, (...), 90%/10%, 100%/0%). The participants were asked to rate to what extent each variant causes him/her to feel that s/he is being treated unfairly by marking the value on a scale from 0 (not at all) to 10 (very strongly). The results showed that people perceived a proportion of 50%/50% to be a fair points distribution ( $M_{50/50} = 0$ ). The split 30%/70% (unfair-beneficiary) or 70%/30% (unfair-victim) ( $M_{30/70} = 6.71$ ;  $M_{70/30} = 7.42$ ) was perceived as unfair (both when the participant was supposed to be a beneficiary and a victim). At the same time, there was no significant difference in perceived level of unfairness between these proportions ( $t(44) = -1.98$ ,  $p > .05$ ). Moreover, there was a significant difference in perceived level of unfairness between the proportions 30%/70% and 50%/50% ( $t(44) = 15.33$ ;  $p < .001$ ) as well as between the proportions 70%/30% and 50%/50% ( $t(44) = 19.56$ ;  $p < .001$ ).

**Table 2** The observed and expected values in lotteries between the experimental groups in gain and loss decision frames – Study 2

	Sure option			Unsure option		
	OC(%)*	EC(%)*	SR*	OC(%)*	EC(%)*	SR*
<b>Gain frame</b>						
Fair group	87(70%)	77.7(71%)	1.1	22(30%)	33.1(29%)	-1.7
Unfair-beneficiary group	70(65%)	76.3(71%)	-0.7	36(31%)	32.9(29%)	1.1
Unfair-victim group	74(69%)	77.0(71%)	-0.3	34(31%)	31.0(29%)	0.5
<b>Loss frame</b>						
Fair group	33(30%)	21.5(20%)	2.5	76(70%)	87.5(80%)	-1.2
Unfair-beneficiary group	10(9%)	21.1(20%)	-2.4	97(91%)	85.9(80%)	1.2
Unfair-victim group	21(19%)	21.3(20%)	-0.1	87(81%)	86.7(90%)	0.0

\*OC – observed counts; EC – expected counts; SR – standardized residual

risk (DOSPERT financial/investment risk scale) ( $F[2,336] = 8.27, p < 0.001, \eta^2 = 0.05$ ). The means for each group were: fair group = 10.18 ( $SD = 3.60$ ); unfair-beneficiary group = 9.01 ( $SD = 3.81$ ); unfair-victim group = 7.97 ( $SD = 4.18$ ). Further analysis (planned contrasts) showed that the unfair-victim group presented a lower propensity to take financial risk than fair ( $t[336] = 4.07, p < 0.001, Cohen's d = 0.54$ ) and unfair-beneficiary ( $t[336] = 2.01, p < 0.05, Cohen's d = 0.27$ ) groups. Moreover, the unfair-beneficiary group obtained lower results on the propensity to take investment risk scale than the fair group ( $t[336] = 2.21, p < 0.05, Cohen's d = 0.30$ ).

**Propensity to Take Investment Risk in the Specific Task** An ANOVA test revealed significant differences between the three experimental groups (experience of (un)fairness: fair, unfair-beneficiary, unfair-victim) in terms of the risk level of the created investment portfolios ( $F[2,336] = 5.46, p < 0.01, \eta^2 = 0.03$ ). The means and  $SD$ s for each group were: fair group = 42.90 ( $SD = 27.17$ ); unfair-beneficiary group = 39.69 ( $SD = 25.18$ ); unfair-victim group = 31.86 ( $SD = 22.39$ ). Further analysis (planned contrasts) showed that the unfair-victim group built safer portfolios than the unfair-beneficiary group ( $t[336] = 2.37, p < 0.05, Cohen's d = 0.32$ ) and fair group ( $t[336] = 3.19, p < 0.005, Cohen's d = 0.44$ ).

Furthermore, the mixed-design ANOVA [3 (experience of (un)fairness: fair, unfair-beneficiary, unfair-victim – between subjects IV) by 3 (form of investment: bonds, mutual funds, stocks – within subjects IV), with a percentage of the amount of money assigned by participants as a dependent variable was conducted to check whether the experimental groups differed in the amount of money assigned to different forms of investments: bonds, mutual funds, and stocks. A significant effect of form of investment was observed ( $F[2,596] = 39.47, p < 0.001, \eta^2 = 0.12$ ). Further post hoc test analyses showed that people were prone to spend less money on stocks than on bonds or mutual funds and less money on mutual funds than on bonds (all the  $p$ 's < .001). A significant interaction between the experience of (un)fairness and the form of investment occurred

( $F[4,596] = 2.92, p < 0.05, \eta^2 = 0.01$ ). Further ANOVA analysis showed that there were significant differences between the groups in terms of their tendency to invest in bonds ( $F[2,336] = 3.58, p < 0.05, \eta^2 = 0.02$ ) and stocks ( $F[2,336] = 5.41, p < 0.01, \eta^2 = 0.03$ ). There were no significant differences observed in the amount of money spent on mutual funds ( $F[2,336] = 0.10, p = 0.90, \eta^2 < .001$ ). Further  $t$ -tests (planned contrasts) revealed that the unfair-victim group allocated more money to bonds and less money to stocks than the unfair-beneficiary group (bonds:  $t[336] = -2.01, p < 0.05, Cohen's d = 0.26$ ; stocks:  $t[218] = 2.51, p < 0.05, Cohen's d = 0.32$ ) and the fair group (bonds:  $t[336] = -2.54, p < 0.05, Cohen's d = 0.35$ ; stocks:  $t[165] = 3.28, p < 0.005, Cohen's d = 0.45$ ). Mean percentages of the amount of money assigned to the different forms of investment for each of the groups analyzed are presented in Fig. 3.

**The Experience of (Un)Fairness and the Propensity to Make Risky Gambling Choices**

**General Propensity to Take Gambling Risk** An ANOVA test did not reveal significant differences between the three experimental groups (experience of (un)fairness: fair, unfair-beneficiary, unfair-victim) in terms of the propensity to take gambling risk (DOSPERT financial/gambling risk scale) ( $F[2,336] = 0.83, p = 0.50, \eta^2 = 0.005$ ). The means for each group were: fair group = 8.33 ( $SD = 4.49$ ); unfair-beneficiary group = 7.80 ( $SD = 3.81$ ); unfair-victim group = 8.42 ( $SD = 4.51$ ).

**Propensity to Take Gambling Risk in the Specific Task** Then, to verify if the experience of (un)fairness influences people's propensity to risky gambling choices in lottery scenarios with gain and loss decision frames, two  $\chi^2$  analyses were conducted.

In the gain frame, the  $\chi^2$  test did not show a significant effect ( $\chi^2(2) = 1.98, p = .37, Cramer's V = 0.08$ , Table 3).

In the loss frame, the  $\chi^2$  test showed a significant, although weak effect ( $\chi^2(2) = 18.18, p < .001, Cramer's V = 0.23$ , Table 3). The sure option was chosen less often than expected

by participants from the fair group and more often than expected by participants from the unfair-beneficiary group ( $|\text{standardized residual}| > 1.96$ , Table 3).

## Discussion

The results of Study 3 were exactly opposite to the results of Studies 1 and 2. People from the unfair-victim group in a non-financial scenario of experimental manipulation were generally less prone to make risky investment choices (measured by the DOSPERT subscale) and built safer investment portfolios with more bonds and fewer stocks than people from the unfair-beneficiary and fair groups. Moreover, the participants from the unfair-beneficiary group were generally less prone to take investment risks (measured by the DOSPERT subscale) than people from the fair group.

In terms of the propensity to take gambling risks, the results were also exactly the opposite to those obtained in Studies 1 and 2 and showed that the sure option in a lottery task was chosen less often than expected by people from the fair group and more often than expected by participants from the unfair-beneficiary group. Similarly to the results of Studies 1 and 2, this relationship was observed only in lotteries with a loss scenario and there were no significant differences observed in the level of general propensity to take gambling risk measured by the DOSPERT subscale.

## General Discussion

In this paper, we reported data from three experiments designed to investigate how unfair treatment in a setting similar to a dictator game affects individuals' propensities to make risky investment and gambling choices in subsequent tasks. We induced the experience of being treated unfairly in two domains, aiming to check whether previously observed effects of financial inequality, unfair treatment, and personal relative deprivation in a financial domain hold when the unfair treatment concerns other resources. We have also taken two domains of financial risk-taking into account, bearing in mind the studies indicating that the propensity to take risk is strongly domain specific. Moreover, the possibility of financial loss, as well as chances for financial gain, was included in lottery scenarios.

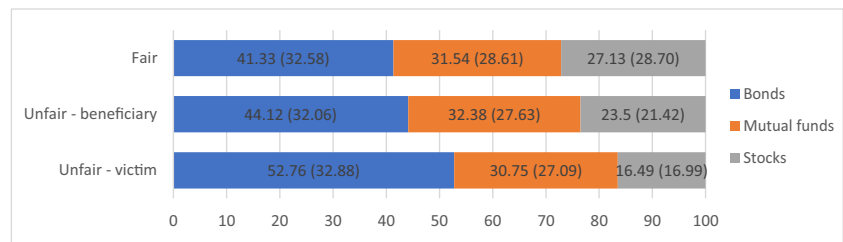
The results of the conducted experiments confirm the significant role of the experience of (un)fairness in explaining subsequent risky financial choices, although the observed effects were rather weak. Importantly, the effect of the (un)fair treatment seems to depend on the type of its consequences – financial or non-financial. Our analyses show that while the experience of unfairness in the financial domain led people to make more risky investment choices, the experience of unfair behavior in the non-financial domain caused the reverse

effect. Specifically, people who experienced unfair negative financial consequences were more prone to take investment risks than those who experienced unfair behavior with positive financial consequences and those who experienced fair treatment. At the same time, the experience of unfair treatment in a non-financial domain led people to be less likely to take investment risks than people from other groups. We did not observe any differences between participants from the three experiential groups in terms of their general propensity to gamble nor in terms of preferences toward sure or unsure options in lottery tasks with a gain frame. However, an important role of decision frames was demonstrated while investigating the propensity to take gambling risks. In a lottery task with a financial loss frame, the beneficiaries of unfair treatment preferred the unsure option over the sure one. On the other hand, people who experienced fair treatment tended to choose the sure option more often than the unsure one. In line with the results regarding investment risk, the effect was reversed for the loss frame in the unfair non-financial experience scenario.

The results of Studies 1 and 2 regarding the propensity to take investment risks are in line with the existing literature reviewed in the introductory part of this paper. We have demonstrated that being a victim of unfairness in a financial domain makes people more prone to take investment risk. Although neither the influence of unfair treatment on the propensity to take risk has not been directly investigated before, nor was the propensity to take investment risk, the existing literature clearly allowed to expect such results. Therefore, we have confirmed the effect that had been indirectly observed before, and extended results of previous studies by demonstrating that an experience of being treated unfairly might affect investment decisions as well.

Previous studies allowed to expect that participants who were treated unfairly would be more prone to gamble. The existing literature showed that a feeling of inequality or personal relative deprivation in a financial domain makes people more prone to gamble (Callan et al. 2011; Haisley et al. 2008; Mishra et al. 2015; Payne et al. 2017). Nevertheless, this effect was not observed in our experiments when the experience of being treated unfairly was induced. One of possible explanations might be the amount of money the participants decided about. While in the present studies risky choices concerned amounts of money pretested to be meaningful (Sekscinska 2015), in the studies conducted so far, risky choices involved very small quotas. In a study of Mishra et al. (2015) participants performed a Choice Task, in which they decided between CAD\$3 for sure and a risky option that ranged from 80% probability of receiving CAD\$3.75 to 10% probability of receiving CAD\$30 (which in 2015 was an equivalent of approximately \$21). Similarly, in a study of Payne et al. (2017) the rewards ranged from \$0.28 to \$3. In the studies of Callan et al. (2011) and Haisley et al. (2008) participant had an

**Fig. 3** Mean percentages of the amount of money assigned to different forms of investment between experimental groups, with SDs in brackets – Study 3



opportunity to buy up to five lottery ticket valued respectively CAD \$1 or \$1, which indicated that they risked up to \$5. Such relatively small amounts of money were probably not perceived as meaningful by the participants.<sup>6</sup> (Sekscinska 2015). Consequently, they were more likely to put them at risk. This assumption is based on studies showing that small amounts of money are spent in a different way than more substantial amounts, for example, they are consumed rather than spend or invested (Sekscinska et al. 2016). Nevertheless, this explanation requires further studies.

It has to be noted that the tendency to gamble is most often explored in a gain frame and little is known about factors influencing decisions in a loss frame. In the present studies, the loss frame of the decision was included and the results show that the experience of unfair treatment may influence people's choices in gambling tasks. The obtained results are the first in this field, therefore they should be interpreted rather as a clue to conducting further studies than as a finding that fills the gap in knowledge.

Most interestingly, the results of Study 3 question the generalizability of the results obtained in previous studies focusing on the consequences of unfair treatment, and suggest that experiencing unfairness in a financial domain might influence subsequent decisions differently than experiencing unfairness in, for example, the social domain. The results indicate that the impact of unfairness on the propensity to take risk is context-specific and does not extend easily on a situation when unfairness is experienced in one domain and a risky decision is made in a different domain. The results of Study 3 highlight context-dependency of risk preferences and suggest that it is not the experience of unfairness per se that influences subsequent risky choices but it is the congruence of experience domain and decision domain that is crucial.

This conclusion is in line with risk-sensitivity theory (see Mishra 2014 for review), which predicts that decision makers shift from risk-aversion to risk-preference in situations of disparity between an individual's present state and desired state. As Mishra (2014) suggests, the risk-sensitivity is a product of a simple heuristic: a person in a situation of a high discrepancy between current and desired state should be more prone to

take risk because it offers the means for pursuing desirable outcomes that would otherwise be unavailable. Therefore, if risky decision do not allow to redeem previous loss or compensate an inequality, individuals should not be motivated to take risk. In the present study, participants who were victims of an unfair financial offer might have sought compensation for their financial loss (compared to a situation if they had been paired with another participant, who decided to split the points in a fair way) by taking financial risk. In the non-financial condition, however, they could not compensate their loss (compared to expected fair 50%/50% split) and thus the shift from risk-averse to risk-seeking tendency did not occur.

A study of Vermeer and Sanfey (2015) also demonstrated that risk preferences depend on specific context. They noticed that the observation that prior losses often induce greater gambling than prior gains is usually confounded with participant performance. They separated the effects of monetary gain/loss from the level of performance in an experimental setting with three groups. Participants from the first experimental group experienced either financial gain or loss based on their performance. Monetary gain or loss group independent from performance were randomly awarded to the participants from the second experimental group. In the third experimental group, participants were given success or failure feedback based on their performance but no monetary incentive. Next, all participants were presented with a gamble that they could play or pass. The results showed that risk preferences are differentially susceptible to prior positive and negative contexts, though only when these preceding contexts involve monetary gains and losses. Thus, this study also demonstrated that previous negative and positive experiences in a non-financial context did not affect monetary risk preferences.

The abovementioned reasoning explains possible reasons why we did not observe increased propensity to take financial risk among participants who experienced unfairness in a non-financial domain. However, we have also observed a lower propensity to take financial risk in this group compared to fair and unfair-beneficiary conditions. As we are not aware of studies investigating the impact of non-financial losses on risky financial decisions, we did not predict this effect. Therefore, we can only offer some post-hoc explanations.

We believe that decreased propensity to take financial risk in the non-financial victim condition is in line with other studies showing that individuals who watched a sad movie clip

<sup>6</sup> We base this assumptions on the results of our previous pilot studies (Sekscinska 2015) showing that for Poles quotas equal PLN 500 (approximately \$130) and above are perceived to be meaningful.

**Table 3** The observed and expected values in lotteries between the experimental groups in gain and loss decision frames – Study 3

	Sure option			Unsure option		
	OC (%)*	EC (%)*	SR*	OC (%)*	EC (%)*	SR*
Gain frame						
Fair group	70 (67%)	73.3 (70%)	−0.4	34 (33%)	30.7 (30%)	0.6
Unfair-beneficiary group	86 (69%)	88.1 (70%)	−0.2	39 (31%)	36.9 (30%)	0.4
Unfair-victim group	83 (76%)	77.6 (70%)	0.6	27 (24%)	32.4 (30%)	−1.0
Loss frame						
Fair group	16 (15%)	30.1 (29%)	−2.6	88 (85%)	73.9 (71%)	1.6
Unfair-beneficiary group	46 (42%)	31.8 (29%)	2.5	64 (58%)	78.2 (71%)	−1.6
Unfair-victim group	36 (29%)	26.1 (29%)	0.0	89 (58%)	88.9 (71%)	0.0

\*OC – observed counts; EC – expected counts; SR – standardized residual

and consequently were in an induced depressed mood were more conservative in taking risk than those who were in a neutral or elated mood (Yuen and Lee 2003). Although our pilot studies (see Supplementary Materials 1) indicated that all the participants treated unfairly, regardless from which domain came the experience, reported similar, lowered mood, only the participants from non-financial condition had no possibility to redeem their loss (compared to what they could have expected). We suggest the presence of the possibility to make up for losses or the lack of it can explain the shift in risk preferences demonstrated by the participants.

We are aware that there might be other explanations for the different results in terms of the propensity to take risk after experiencing an unfair treatment with financial and non-financial outcomes, although further studies are needed to replicate the effect obtained in Study 3 across various domains of non-financial unfair treatment and various domains of risky decisions in order to discover the psychological mechanisms underlying the obtained results. Nevertheless, the results of this study offer issues and questions that we believe serve as avenues for future research and thus we find them very valuable. Specifically, further studies should focus on the importance of the congruence of experience domain and decision domain. The primary focus of the present studies was the propensity to take financial risk. However, in order to broaden our understanding of the obtained results, consecutive research project will take into account other domains of risk-taking, for example, social or health. This will not only allow to test the hypothesis referring to the congruence of domains but also to determine whether the experience of unfairness also affects other domains of risk-taking.

The present studies have several important theoretical implications for the literature on fairness and risk-taking. Firstly, they add to the literature on the consequences of experiencing unfairness by demonstrating that the experience of unfair treatment might alter people's propensity to take risk. This issue, to our best knowledge, has not been directly investigated before. At the same time, we have demonstrated the

importance of the context in which the unfairness is experienced and whether it is congruent with subsequent risky decision or not. Therefore we have shown that the results of previous studies cannot be generalized and the notion that unfairness, inequality or personal relative deprivation increases individual preferences for risk taking is not so straightforward. Thus, the results of unfairness might not be universal, and the impact of unfair treatment might depend crucially on the situational context of this experience. Secondly, we confirmed the results of those few studies which show that being treated unfairly spills over into subsequent decisions. We are aware of only three studies that have demonstrated this kind of effect so far. Houser et al. (2012) found that the perception of being treated unfairly increases an individual's propensity to cheat. Unfair treatment was also shown to help performance in sport (Axt and Oishi 2016). Sekścińska and Rudzińska-Wojciechowska (manuscript under review) found that being treated unfairly impacts the level of subsequent donations to charities. The results of the current experiments also advance the literature on risk-taking by proposing another situational factor that influences risky decisions and investment choices in particular.

The practical contributions of the studies are also important. Bearing in mind how important it is to promote reasonable financial decisions, establishing factors that might influence them without decision-makers' knowledge might help to understand the mechanisms standing behind investment choices. Perhaps revealing such mechanisms to the interested decision-makers might enable them to avoid taking unnecessary risk and make more rewarding financial choices. Being aware that recent social experiences influence our choices might make consumers more sensitive and more cautious while making decisions that involve taking risk. Thus, the results might be of interest to the institutions that aim to understand consumer financial decisions.

More generally, the present findings contribute to a more nuanced view of the processes that drive consumers to make risky financial choices. Specifically, financial decisions are

expected to be rational, based on knowledge of relevant facts, such as household financial situation, its long-term plans, etc. However, investors' irrationality has been a subject of interest at least since the pioneering work of Tversky and Kahneman (1973, 1974). The present studies present another, not investigated previously, situational factor that might play an important, causal role in motivating financial risk-taking for its victims. Taking into account that the world we live in is characterized by systemic injustice as well as everyday experiences of unfair treatment, the findings seem to be exceptionally important. In everyday situations repeated feedback emphasizing unequal distribution of financial assets among poorer groups of societies might lead to elevated propensity to take investment risk, which might potentially lead to financial problems. On the other hand, people who face discrimination or other forms of unfairness in a social domain, such as unequal access to health-care or education, might avoid financial investments even though their financial situation indicates that it would be profitable for them. While these results are interesting, they have limitations. Most notably, we relied on self-reported data. Therefore, investment decisions, as well as gambling choices, were based on participants' declaration of their intentions. Nevertheless, while the use of real financial choices seems desirable, it is hard to imagine a research grant high enough to provide endowments perceived as meaningful and realistic in tasks related to investment risk. What is more, studies show that the results of experiments with hypothetical rewards are valid in representing everyday life (Johnson and Bickel 2002; Kühberger et al. 1999; Locey et al. 2011). Another limitation is that the temporal duration of the induced experience of (un)fairness. Remains unknown, as participants made financial choices immediately after experimental manipulation. It is also worth to notice that while investigating participants' propensity to make risky investment choices, we have only focused on the propensity to take investment risk and did not take into account the propensity to invest, which is another aspect of investment decision-making, reflecting whether one wants to invest or not. Further studies could take into account both the propensity to invest and the propensity to take investment risk.

The studies open several avenues for further research. Firstly, individual variables reflecting one's sensitivity to violations of moral norms, such as, for example, justice sensitivity (Schmitt et al. 2005), could be included into further studies in order to control their moderating role. Moreover, the role of culture should be taken into account, as all the reported studies were conducted in the same country (Poland). Meanwhile, it was demonstrated that there are differences between populations in terms of reactions to unequal behavior (Henrich et al. 2006) and that national culture is an important factor for explaining risk-taking propensity (Breuer et al. 2017) and risk perception (Weber and Hsee 1998). Therefore future studies could focus on a moderating role of culture in the relationship

between unfairness and the propensity to take risk. Taking into account that Polish culture can be described as a hierarchical, Masculine and Individualist society with a very high preference for avoiding uncertainty and low scores on long term orientation and indulgence (Hofstede and Minkov 2010) research projects focusing on the consequences of unfair treatment for risky decisions conducted in countries that are different in terms of those dimensions would be valuable. Special attention should be given to the dimension of individualism, as it has been linked to financial risk preferences in previous studies (Breuer et al. 2014) and the dimension of power distance, as it reflects the attitude of a culture towards inequalities in societies (Hofstede and Minkov 2010) and might be reflected in reactions to unequal treatment on an individual level. Further studies will also need to clarify the role of intentionality. Will the effect of unfairness on risk-taking be similar following unfair treatment that is believed to be accidental?

**Authors' Contribution** Katarzyna Sekścińska – Conceptualization, Funding acquisition, Methodology, Project administration, Formal analysis, Writing – original draft, review & editing; Joanna Rudzińska-Wojciechowska - Methodology, Writing – original draft; review & editing.

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**Data Availability** The complete data for all studies can be found at the Open Science Framework (OSF): [https://osf.io/8wc9b/?view\\_only=6f99e467067043fdb69028d9b11e031a](https://osf.io/8wc9b/?view_only=6f99e467067043fdb69028d9b11e031a). Original materials used to conduct the research are available on e-mail request: ks@psych.uw.edu.pl.

## Compliance with Ethical Standards

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Conflict of Interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

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