Experimental Economics (2025), 1–19
doi:10.1017/eec.2025.10011

economic science association

CAMBRIDGE UNIVERSITY PRESS

ORIGINAL PAPER

Fairness and willingness to compete

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(Received 10 August 2022; revised 31 May 2024; accepted 2 May 2025)

Abstract
Many societies allocate wealth and status through competitions. These competitions may be seen as unfair if the playing field is uneven or if the competitors are of unequal strength. We run two experiments to document the extent to which people are willing to compete against others in situations with varying fairness concerns. In a between-subject experiment, we show that people's willingness to compete is largely unaffected by the impact their choice has on the payoff of an opponent, no matter whether the opponent had a choice about whether to compete or not. In a within-subject experiment, we show that most people are willing to compete against opponents who have been exogenously disadvantaged or are known to be weaker. People who choose competition against weak or disadvantaged opponents are also more willing to give themselves an advantage by sabotaging the performance of their opponent.

Keywords: Willingness to compete; competitiveness; fairness

JEL Codes: C91; D91

1. Introduction

Societies and institutions are characterized by varying degrees of competition for wealth and status. This competition has characteristics that generate important fairness concerns. Some competitors may enter the fray in a much stronger position than others, and the playing field may be tilted in favor of certain groups or individuals. Participation in these competitions is not always voluntary, as exposure often depends on economic and political decisions made by others. For instance, consider university admissions, where students from underprivileged neighborhoods – facing inadequate schools and polluted environments – must compete against peers from privileged families, often with added advantages like legacy admission.

We are interested in how people in positions of power make competitive choices that affect both themselves and others, especially when potential opponents are known to be weaker or exogenously disadvantaged. The large experimental literature on willingness to compete tells us little about this. In the standard experimental design based on Niederle and Vesterlund (2007), the decision to compete is purely individual and does not affect anyone else's payoff. Consequently, fairness concerns are excluded by design. Moreover, in the more recent experimental literature, the rules of competition are either symmetric across participants or asymmetric with the aim of correcting an existing imbalance, such as the underrepresentation of women due to gender differences in preferences (Balafoutas & Sutter, 2012; Niederle et al., 2013). This contrasts with most real-world competition where asymmetries favoring one party over another are prevalent.

We examine the impact of fairness concerns on willingness to compete through two experiments in which participants are randomly and anonymously paired with another participant and choose between a winner-takes-all competition and sharing the prize. In the first experiment, we gradually modify the classic design that measures people's willingness to compete in a real-effort task against the past performances of randomly selected opponents whose payoff is unaffected by the decision. In between-subject treatments, we randomly manipulate whether the decision to compete affects the opponent's payoff – introducing potential concerns about distributive fairness – and whether the opponent had made a choice about whether to compete or not – potentially introducing concerns about procedural fairness (Trautmann, 2023).

In the second experiment, we use a within-subject design to examine how the fairness of the competitive setting affects people's willingness to choose competition for oneself and an opponent. Participants choose between winner-takes-all competition and sharing the prize with another participant. The competition choice is unilateral and choosing competition therefore means that the opponent must compete whether they want to or not. The competition choice is made under six different conditions, across which we vary the evenness of the playing field and the strength of the opponent (and therefore potential concerns about procedural fairness). In a final seventh scenario, participants decide whether they want to sabotage the opponent's chances in an otherwise fair competition, thereby tilting the playing field in their own favor. These experiments are designed to examine whether fairness considerations can override self-interest in competitive settings. In the first experiment, this would be reflected by lower competition entry in the treatments where winning the competition creates a loser who earns nothing than in the treatments where the competition choice does not affect the payoff of another participant. In the second experiment, this would be reflected by the existence of people who compete in a baseline condition but do not compete when they are given an advantage. To guide the interpretation of the results, we provide a simple conceptual framework.

Our results show that for a majority of individuals, concerns for others do not play a decisive role when deciding whether to compete. In the first experiment, average willingness to compete does not depend on whether the decision to compete affects the payoff of an opponent. This is true independently of whether the opponent had a choice about whether to compete or not. In the second experiment, we find that most participants are willing to unilaterally choose competition against opponents whose performance is exogenously handicapped or who are known to be much weaker. Taking advantage of the within-subject structure of our data and guided by our conceptual framework, we use the six competition choices to identify which participants clearly show fairness concerns. Participants who demonstrate fairness concerns are those who choose to compete in at least one of the even baseline conditions but do not compete when the competition is tilted in their favor. We identify concerns for fairness in only 6 percent of the participants who make consistent choices. At the same time, 39 percent of participants refuse the opportunity to sabotage their opponent's performance, indicating that they attach at least some weight to fairness concerns in a competitive setting. We also find that the willingness to compete with an exogenous advantage is strongly positively related to the willingness to sabotage the opponent when offered the chance.

A large experimental literature based on pioneering papers by Gneezy et al. (2003) and Niederle and Vesterlund (2007) documents individual differences in willingness to compete using incentivized choice experiments. Most of these studies are focused on documenting the existence of a gender gap whereby men are more competitive than women (see Croson & Gneezy, 2009; Niederle & Vesterlund, 2011; Niederle, 2016 for surveys). It has also been shown that willingness to compete predicts educational and occupational outcomes (Buser et al., 2014, 2024; Reuben et al., 2024).[1] We contribute

[1]Buser et al. (2014) and Buser et al. (2017) show that an incentivized measure of competitiveness predicts specializing in more prestigious and math-heavy subjects for Dutch and Swiss secondary-school students from the top of the ability distribution (pre-university track). Reuben et al. (2024) show the same for the starting salaries and industry choices of MBA graduates. Other studies find that competitiveness predicts participating in a competitive high school entrance exam (Zhang, 2012), investment choices of entrepreneurs (Berge et al., 2015), choosing an ambitious college track in high school (Almås et al.,

https://doi.org/10.1017/eec.2025.10011 Published online by Cambridge University Press

to this literature by examining people's willingness to compete in an economic environment where – contrary to the typical design used in past experiments – competition has an impact on the payoff of the opponent and the playing field is sometimes uneven. This allows us to investigate the role played by fairness concerns in determining people's willingness to compete.

Another large experimental literature has documented that fairness concerns and other moral considerations shape distributive behavior (Almås et al., 2010, 2020; Bolton & Ockenfels, 2000; Cappelen et al., 2007, 2013; Cappelen & Tungodden, 2019; Durante et al., 2014; Falk et al., 2003, 2008; Fehr & Schmidt, 1999; Konow, 2000), but it has also been shown that these considerations seem to be less important in market settings (Bartling et al., 2023; Bartling & Özdemir, 2023; Bartling et al., 2015; Besley, 2013; Bowles, 1998; Falk & Szech, 2013; Kirchler et al., 2016; Sandel, 2012; Savani & Rattan, 2012; Vohs et al., 2006; Ziegler et al., 2024).[2] In a recent related paper, Schildberg-Hörisch et al. (2023) look at willingness to compete in tournaments that have quota rules for low-performing individuals. Comparing the willingness to choose a tournament over piece-rate incentives across treatments, they find that targeted subjects are more willing to compete under quota rules that are generally perceived to be fairer and non-targeted subjects are more willing to compete under quota rules they personally perceive as fair.[3] In contrast, we focus on situations where the decision-maker receives an advantage (or disadvantage) rather than on external interventions that address preexisting disadvantages. Our results suggest that self-interest considerations are more important than fairness considerations for competition choices. This finding may also shed light on why some people are less prosocial in markets since competition is a key feature of most markets.[4]

Finally, our study contributes to the wider literature on the sorting effects of incentive schemes (e.g. Dohmen & Falk, 2011), and in particular on the impact of using competitive incentive schemes on self-selected worker's characteristics and worker choices that are not directly related to productivity. The experimental literature on competition entry documents that competition selects individuals who are risk-seeking, confident, and disproportionally male (Niederle, 2016). Bartling et al (2009) further find that individuals who choose to compete tend to be less egalitarian.[5] Relatedly, Müller and Rau (Müller & Rau, 2016, 2019) find a link between risk preferences and inequality aversion. Buser et al (2024) and Buser and Oosterbeek (2023) show that willingness to compete correlates with other economic preferences and personality traits like risk tolerance, negative reciprocity, and extraversion.[6] We contribute to this literature by looking at whether individuals who are attracted to competitive settings are also more willing to compete in competitions that are tilted in their favor or to actively engage in sabotage behavior. We find that the vast majority of participants who choose to

2016), future salary expectations of undergraduate students (Reuben et al., 2017), career choices at the vocational education level (Buser et al., 2022), and labor market outcomes (Buser et al., 2024; Buser & Oosterbeek, 2023). See Lozano et al. (2022) for a survey of this literature. Flory et al. (2015), Samek (2019), and Buser et al. (2023) document gender gaps in willingness to compete in field settings.

[2]See also Weigelt et al. (1989) and Schotter and Weigelt (1992), who study performance in tournaments and find that when one of two players has an unfair advantage, both players reduce their effort.

[3]A related experimental literature investigates the impact of affirmative action mechanisms on the tournament entry of men and women, motivated by studies that find a gender difference in willingness to compete. While these studies are not explicitly concerned with the fairness of the competitive setting, they do show that, on average, women are willing to take advantage of the exogenous advantages presented to them, which could be seen as unfair. Balafoutas and Sutter (2012) and Niederle et al. (2013) show that women are more likely to enter a mixed-gender competition if one of two winning spots is reserved for women. Czibor and Dominguez Martinez (2019) show that such gender quotas applied in the final round of a multistage tournament increase competition entry by women already in the first round.

[4]See also Prasnikar and Roth (1992), who show that in an ultimatum game with competition, payoffs on the competing side quickly converge to zero.

[5]In particular, they find that individuals who are averse to being ahead in a social preference game are less likely to choose to compete. It is important to point out that in their setting, as in most of this literature, the decision to compete does not affect anyone else's payoff.

[6]Liu and Treich (2021) show that the optimality of winner-takes-all tournaments also depends on the contestants' risk preferences.

https://doi.org/10.1017/eec.2025.10011 Published online by Cambridge University Press

enter a fair baseline competition also choose to compete when they receive an advantage. Moreover, individuals who compete mainly or exclusively when they have an advantage are also more likely to engage in sabotage when given the opportunity. This suggests that competitive settings – and in particular competitive settings that may be perceived as unfair – attract people willing to engage in counterproductive behavior.[7]

2. Experimental design and sample

Our study consists of two experiments – a between-subject experiment and a within-subject experiment – that were run in a fixed order on the same participants. The participants had to perform a real-effort task three times (one time in the first experiment and two times in the second experiment). One of these three performances was randomly chosen to be relevant for the payment. Participants did not receive feedback on their performance or payment at any point during the experiment.

2.1. The between-subject experiment

In the between-subject experiment, participants choose between two payment schemes for a real-effort task: competition against one other participant or individual incentives. With competition incentives, the participant who first completes 10 simple addition tasks (adding up sets of four two-digit numbers) earns 200 Norwegian Kroners (NOK, around 20 Euros), while the slower participant earns nothing). With individual incentives, participants earn 100 NOK for completing the 10 tasks, regardless of the time they take.

In a two-by-two design (summarized in Table 1), we vary whether the decision to compete affects an opponent's payoff and whether the opponent had a choice about whether to compete or not. In the *No impact, No Choice* treatment, participants who choose to compete, have their performance compared with the performance of a randomly selected participant who is competing against someone else.[8] The competition choice and performance therefore have no impact on the payoff of the other participant. In the *Impact, No Choice* treatment, participants who choose to compete are matched with a randomly selected participant who had no choice about whether to compete and whose payoff depends on the outcome of the competition. In the *Impact, Choice* treatment, winning again creates a loser, but participants compete against another participant who also chose competition. Finally, in the *No impact, Choice* treatment, the participants who choose to compete have their performance compared with the performance of another participant who also chose to compete, but the competition choice and performance do not impact the payoff of this other participant.[9]

This experimental design allows us to study whether the choice to compete is affected by the competition having an impact on another participant (comparing the treatments with and without

[7]Because the outcome of a tournament depends on relative rather than absolute performance, competitive remuneration schemes may create incentives for behavior that is bad for overall productivity, such as sabotage of competitors (Chen, 2003). Harbring and Irlenbusch (2011) show that in a repeated tournament in the lab, a higher wage spread leads to more sabotage. Charness et al. (2014) show that ranking incentives induce individuals to engage in sabotage and to artificially enhance their own performance. Carpenter et al. (2010) show that the possibility of sabotage leads to lower effort. See Chowdhury and Gürtler (2015) for an overview of the literature on sabotage in contests. Buser and Dreber (2016) find that competitive incentives can spill over to reduce willingness to cooperate in a seemingly unrelated setting. Hansson et al. (2021) allow participants in a tournament to ex-post redistribute the earnings. They find that losers incorrectly believe the competition was stacked against them and that informing participants of the fairness of the competition reduces selfish behavior among losers but not among winners. See also Dato and Nieken (2014) and Dato and Nieken (2020) who find that women are on average less willing to sabotage an opponent than are men.

[8]'No choice' refers to the opponent being forced to compete (against a third participant) and therefore not having self-selected into competition.

[9]On top of these four treatments, some participants were randomly allocated to a comparison group who made no active choice. This group is needed because in the *No impact, No choice* and *Impact, No choice* treatments, competition occurs against participants who have no choice whether to compete.

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Table 1. Treatments in the between-subject experiment

	No Choice	Choice
No impact	Compete against the *performance* of another participant who had *no choice* about whether to compete or not; winning or losing *does not affect* the payoff of the other participant	Compete against the *performance* of another participant who *chose to compete*; winning or losing *does not affect* the payoff of the other participant
Impact	Compete against another participant who had *no choice* about whether to compete or not; winning or losing *affects* the payoff of the other participant	Compete against another participant *who chose to compete*; winning or losing *affects* the payoff of the other participant

impact), and how this effect depends on whether the opponent chose to compete or not (comparing the effect of impact in the no choice and choice treatments).

2.2. The within-subject experiment

In the second experiment, participants first complete a baseline round where they are anonymously paired with another participant. They are informed that the participant who first completes the real-effort task – which again consists of 10 simple addition tasks – earns 200 NOK, while the slower participant earns nothing (first-past-the-post competition). The performance in this initial round gives us a measure of performance under competition.

Participants are then paired with another randomly selected participant and asked to choose the incentive scheme that will be applied to the final round of the real-effort task. This choice is made under six different conditions and determines the payoff of both participants in the pair. For each condition, participants need to choose between individual incentives and competition. The incentives are the same as in the between-subject experiment. If individual incentives are chosen, each of the two participants in a pair earns 100 NOK for finishing the 10 problems, no matter the time they take to do so. If competition is chosen, the participant who completes the sums the fastest receives a prize of 200 NOK, while the other gets nothing.

In the two baseline conditions, the competition is even. In the other conditions, it is tilted in favor of or against the decision-maker. We consider two possible sources of unfairness: competition on an uneven playing field and competition between participants of unequal strength. Table 2 describes the six conditions.[10]

In a final seventh decision, we study whether participants are willing to turn a competition against a random stranger into a competition to their own advantage. In this decision, participants could choose whether to tilt the playing field in their own favor by adding 20 seconds to the time of their opponent. We refer to this choice as the *sabotage* decision. The sabotage decision was presented on a separate screen after the six competition decisions.

[10]The advantage of a 20-second bonus increases the chance of winning by 5 to 10 percentage points, depending on the participant's place in the performance distribution. Facing a slower rather than equal opponent has a stronger impact on the likelihood of winning, increasing it by around 20 percentage points on average. We did not elicit the participants' beliefs about how much the advantage and the weaker opponent increased their chance of winning.

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Table 2. Conditions in the within-subject experiment

	Evenness of playing field	*Equality of match*
Baseline	Compete against a randomly selected opponent	Compete against an opponent who performed equally well (± 20 seconds) in the initial round
Advantage	Compete against a randomly selected opponent with a bonus of 20 seconds deducted from the final time	Compete against an opponent who was at least 20 seconds slower in the initial round
Disadvantage	Compete against a randomly selected opponent with a penalty of 20 seconds added to the final time	Compete against an opponent who was at least 20 seconds faster in the initial round

We use a strategy method whereby each participant makes the competition choice under each condition. The seven conditions are presented to participants in a fixed order.[11] In case the within-subject experiment is chosen for payment, one of the seven decisions of one of the two members of each pair is then randomly chosen and applied to the final task performance to determine the payoff of both participants in the pair. The appendix contains the complete set of screenshots.

2.3. Sample and background statistics

The sample consists of two waves of first-year students at NHH Norwegian School of Economics in Bergen, Norway. The experimental sessions were conducted in late September and early October 2018 and 2019. The sabotage decision was only implemented in the second wave in 2019. Otherwise, the experimental design in the two waves is identical. Participation in the experiment was a requirement for the introductory economics course. The experimental sessions were conducted in a computer lab using a web-based interface and were double-blind, ensuring that neither subjects nor experimenters could link decisions to individual participants. Participants were told they would receive a show-up fee and could earn more money in the experiment. Each session lasted approximately one hour.

At the very end of the experiment, we asked survey questions on risk preferences, competitiveness, beliefs about relative performance (confidence), gender, and age. Risk preferences are elicited with the following question taken from Dohmen et al. (2011). 'How do you see yourself: are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?' (scale: from 0 'not at all willing to take risks' to 10 'very willing to take risks'); competitiveness with the following question taken from Buser et al. (2024). 'How competitive do you consider yourself to be. Please choose a value on the scale below, where the values 0 means "not competitive at all" and the value 10 means "very competitive"'; confidence with the following question. 'How fast do you think you performed (on average) in the tasks compared to the other students who participated?' (scale: from 1 'Slowest 10%' to 10 'Fastest 10%').

Table 3 shows background statistics for the full sample, see Table A1 in the appendix for background statistics separately by gender. The full sample consists of 802 participants (406 in 2018 and 396 in 2019). We report average values for performance (in the initial round), gender, and age, and the three survey measures – risk preferences, competitiveness, and confidence – for the sample as a whole

[11]The participants first saw the three *evenness-of-playing-field* conditions and then the three *equality-of-match* conditions, followed by the sabotage choice. The equality-of-match competition decisions were presented on the same screen, where the participants in each case choose whether to compete against their opponent. The fixed order in which the decisions were presented means that we cannot separate potential order effects from the effects of the experimental conditions themselves.

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Table 3. Background statistics

		Treatment in the first experiment					
	All	No impact, No choice	Impact, No choice	No Impact, Choice	Impact, Choice	Comparison group	p-val
Performance	0.50	0.48	0.50	0.49	0.50	0.54	0.66
	(0.29)	(0.29)	(0.28)	(0.31)	(0.28)	(0.29)	
Risk-seeking	5.48	5.30	5.64	5.73	5.19	5.60	0.04
	(1.95)	(2.05)	(2.00)	(1.89)	(1.81)	(1.99)	
Competitiveness	7.12	7.11	6.93	7.18	7.05	7.53	0.26
	(1.95)	(1.95)	(2.03)	(1.87)	(1.98)	(1.80)	
Confidence	5.48	5.53	5.43	5.49	5.30	5.79	0.28
	(1.99)	(1.94)	(1.89)	(2.09)	(1.98)	(2.11)	
Female	0.37	0.35	0.40	0.31	0.39	0.39	0.58
	(0.48)	(0.48)	(0.49)	(0.46)	(0.49)	(0.49)	
Age	20.53	20.42	20.40	20.63	20.72	20.43	0.52
	(1.96)	(1.25)	(1.57)	(1.67)	(3.04)	(1.64)	
Observations	802	176	181	179	177	89	

Note: This table reports means for a set of individual characteristics (standard deviations in parentheses) for the full sample and by treatment in the first, between-subject experiment. Performance is the rank in the initial round normalized to a range of 0–1. Competitiveness and risk-seeking are measured on a scale from 0 to 10. Confidence is measured on a scale from 1 to 10 corresponding to their belief about which performance decile they belong to. Age is measured in years. p-values are from Kruskall–Wallis tests of differences across the five treatment groups.

and by treatment in the between-subject experiment (participants were randomly allocated to four experimental treatments or a comparison group who compete no matter what and serve as competitors for participants who enter competition in the 'no choice' treatments). Only the survey measure of risk-seeking varies significantly across treatments. We control for the background variables in the analysis, as well as treatment assignment in the between-subject experiment, when analyzing the data from the within-subject experiment.

3. Conceptual framework

We here present a simple conceptual framework to guide our interpretation of the data.

We consider a situation where a decision-maker chooses an institutional framework (I) under which they can earn income. The decision-maker can choose between competing (I = C) or not competing (I = NC). Their income is greater when competing than when not competing if they win the competition, but lower if they lose. The decision-maker is motivated by self-interest and (possibly) by fairness. Self-interest considerations include the expected monetary payoff from choosing an institution, risk preferences, and competitiveness preferences. Fairness considerations include procedural and distributive fairness preferences.

We can capture these two motivations by the utility function:

$$U(I) = v(I) - \beta * uf(I), \tag{1}$$

where v(I) is the expected utility from self-interest considerations, uf(I) $\geq$ 0 is a measure of how unfair the decision-maker considers the institution, with uf(I) = 0 if the institution I is not considered unfair, and $\beta \geq 0$ is the relative weight assigned to fairness considerations. We assume that the non-competitive institution, where the decision-maker and the opponent are paid equally for completing the same task, is not considered unfair: uf(NC) = 0.

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Focusing on strict preferences, it follows from (1) that the decision-maker competes if the self-interested gain from competing is greater than any loss from the competition being unfair:

$$v\,(C) - v\,(NC) > \beta * uf\,(C) \tag{2}$$

In the classic willingness-to-compete experiment (Niederle & Vesterlund, 2007) – where the choice of institution only affects the payoff of the decision-maker – fairness considerations do not play a role, and the decision-maker competes if v(C) > v(NC).

In our between-subject experiment, we manipulate whether the competition affects the opponent's payoff and whether the opponent self-selects into competition. In the analysis of these treatments, we make two main assumptions:

A1. The self-interest considerations are independent of whether the opponent's payoff is affected or not.

A2. Competition is considered (weakly) more unfair if it affects the payoff of an opponent who has no choice about whether to compete or not, compared to an opponent who self-selects into competition.

A1 is satisfied by design regarding the beliefs about winning the competition: the opponent is drawn from the same sample independent of whether the opponent's payoff is affected or not. However, A1 assumes more generally that no self-interest considerations are influenced by this manipulation. A2 shows that a concern for procedural unfairness may add to any concern for distributive unfairness when the opponent has not self-selected into competition.

Within this framework, we can examine the effect of manipulating whether the opponent's payoff is affected on the willingness to compete of the decision-maker. Independent of whether the opponent self-selects into competition, it follows from A1 and equation (2) that: (i) individuals who do not compete when the competition does not affect the opponent's payoff also do not compete when it does; (ii) individuals who compete when competition does not affect the opponent's payoff also compete when it does, provided they do not consider such competition unfair or do not place a large weight on fairness; and (iii) individuals who compete when competition does not affect the payoff of the opponent do not compete when it does, provided they consider such competition unfair and place sufficient weight on fairness. A2 implies that this is more likely to occur when the opponent is forced to compete than when the opponent self-selected into competition.[12]

Taken together, this framework provides the following main prediction for the between-subject experiment. Willingness to compete is (weakly) lower when the competition affects the opponent's payoff, independent of whether the opponent had a choice about whether to compete or not. This reduction in the willingness to compete is (weakly) greater when the opponent had no choice about whether to compete.

In the within-subject experiment, we consider only situations where the choice of competition affects the opponent's payoff. We manipulate the evenness of the playing field or the equality of the match relative to a baseline condition with a level playing field or an equal match. In each context,

[12]The direct effect of manipulating whether the opponent has self-selected into competition on the willingness to compete depends on how it influences the decision-maker's self-interest considerations, including their belief about winning the competition. Suppose that competing is considered (weakly) more attractive from a self-interest perspective when the opponent self-selects into competition. In this case, independent of whether the opponent is affected or not, it follows from A2 and (2) that: (i) individuals who compete when the opponent has no choice about whether to compete also compete when the opponent self-selects into competition, and (ii) individuals who do not compete when the opponent has no choice about whether to compete may compete when the opponent self-selects into competition. In the latter case, whether we observe an increase in the willingness to compete depends on the effect on self-interest when the opponent is not affected, as well as the effect on fairness and the weight placed on fairness when the opponent is affected. Conversely, if competing is considered less attractive from a self-interest perspective when the opponent self-selects into competition, the willingness to compete decreases when the opponent's payoff is not affected. However, when the opponent's payoff is affected, the qualitative effect is indeterminate, as self-interest and fairness pull in opposite directions.

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we consider two situations: one where competition is tilted to the advantage of the decision-maker (C–A), and another where it is tilted to the disadvantage of the decision-maker (C–D). We assume that competition is considered more attractive from a self-interest perspective when the competition is to the advantage of the decision-maker, $v(C–A) > v(C)$, and less attractive when it is to the disadvantage of the decision-maker, $v(C–D) < v(C)$. Additionally, we assume that the manipulations increase the perceived (procedural) unfairness of the competition: $uf(C–A) > uf(C)$ and $uf(C–D) > uf(C)$. However, we make no assumption about whether competing at an advantage is considered more unfair than competing at a disadvantage – $uf(C–A) < > uf(C–D)$ – or about whether tilting the evenness of the playing field is considered more unfair than tilting the equality of the match.

We can examine the effect of tilting the competition to the advantage of the decision-maker on willingness to compete within our framework. Consider a decision-maker who competes in the baseline condition. It follows from (2) that $v(C) > v(NC)$ (since $\beta^* uf(C) \geq 0$). By assumption, $v(C–A) > v(C)$, and hence it follows that, $v(C–A) > v(NC)$. Consequently, the decision-maker competes with an advantage if they are sufficiently self-interested (β is sufficiently small) or they do not consider competing with an advantage to be particularly unfair ($uf(C–A)$ is sufficiently small).

If the decision-maker does not compete in the baseline condition, it follows from (2) that we cannot rule out that $v(C) < v(NC)$. This would be the case if they consider competition in the baseline condition to be fair, $uf(C) = 0$, but may also hold if they consider competition in the baseline condition to be unfair. It follows that if they also do not compete when the competition is tilted to their advantage, we cannot rule out that this is due to self-interest considerations, $v(C–A) < v(NC)$, rather than fairness considerations.

Finally, consider the effect of tilting the competition to the disadvantage of the decision-maker. In this case, it follows straightforwardly from (2) and the assumptions that $v(C–D) < v(C)$ and $uf(C–D) > uf(C)$ that (i) people who compete in the baseline condition may or may not compete when the competition is tilted to their disadvantage, and (ii) people who do not compete in the baseline condition also do not compete when the competition is tilted to their disadvantage.

Taken together, the framework provides the following predictions for the comparison to the baseline conditions in the within-subject experiment:

Decision-maker at an advantage.

- Willingness to compete is (weakly) greater when at an advantage if self-interest considerations outweigh fairness considerations, and (weakly) lower if fairness considerations outweigh self-interest considerations.

Decision-maker at a disadvantage.

- Willingness to compete is (weakly) lower when at a disadvantage, with both self-interest and fairness concerns pulling in the same direction relative to the baseline condition.

The framework can also be used for an individual-level analysis of the choices in the within-subject experiment. First, we can determine the extent to which people make choices that are inconsistent with the framework, which would be the case if they choose to compete when at a disadvantage but not in the baseline conditions. Second, we can classify the consistent participants according to whether their choices reveal that they assign positive weight to fairness considerations ($\beta > 0$). It follows from (2) that people who in at least one of the two contexts – evenness of playing field or equality of match – compete in the baseline condition but not when they receive an advantage, assign a positive weight to fairness considerations. We label these individuals as *fair*. In contrast, for all the

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other consistent participants, including those who always compete or never compete, we cannot rule out the fact that their choices are driven only by self-interest considerations. We label these individuals as *self-interested*. Importantly, the labels are just meant to indicate what we have identified or not through the individuals' choices in the experiment and should not be read as representing that these individuals are only or mainly concerned with fairness or self-interest.

In the within-subject experiment (second wave), people also made a sabotage choice about whether to tilt the competition to their advantage by adding a time penalty to the performance of the opponent. Choosing to sabotage increases the likelihood of winning and, we assume, makes it more attractive to compete from the self-interest perspective. At the same time, it increases the unfairness of the competition. If someone refuses the sabotage opportunity, it therefore follows from (2) that they put a strictly positive weight on fairness considerations.

4. Results

We present the results in two parts. Section 4.1 shows the results from the between-subject experiment and Section 4.2 shows the results from the within-subject experiment.

4.1. Between-subject experiment

Fig. 1 shows the share of participants choosing to compete across treatments. We compare the willingness to compete when the competition has no impact on the payoff of the opponent (*No Impact*) to when it has an impact (*Impact*) under two different conditions: first, when the opponent had no choice about whether to compete (*No Choice*), and second, when the opponent self-selected into competition (*Choice*).

The left-hand panel of Fig. 1 shows the comparison between *No Impact* and *Impact* treatments when the opponent self-selected into competition. In this situation, the share of participants who choose to compete is unaffected by whether the competition creates a loser. The right-hand panel shows the same comparison when the opponent had no choice about competing. Here, we observe a slight increase in aggregate willingness to compete when winning the competition means someone else loses, but this difference is not statistically significant.[13]

Table 4 shows the corresponding OLS estimates of the treatment effects without and with standard set of controls used in much of the experimental competitiveness literature: gender, risk preferences, confidence, and performance in the initial round. The regression estimates confirm that whether competing affects the payoff of another participant has no significant effect on willingness to compete, both when that participant self-selected into competition and when they had no choice about whether to compete or not.

We summarize this analysis in the following result:

> **Result 1:** *Willingness to compete is not influenced by whether competing affects the payoff of the opponent. This is true both when the opponent self-selected into competition and when they had no choice about whether to compete.*

Within our conceptual framework, this result shows that fairness considerations are not of great importance for people's willingness to compete in the between-subject experiment. This may reflect that people do not find the competitive institution unfair (regardless of whether the opponent has a choice) or that fairness considerations are outweighed by self-interest considerations.

Figure A1 in the appendix shows competition entry rates in each of the treatments by gender. In line with the existing literature, there is a large gender difference in willingness to compete, both

[13]Finally, comparing across the two panels, we do not find evidence of the opponent self-selecting into competition having a significant effect on the willingness to compete.

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overall – 48 percent of men and 17 percent of women choose competition ($p < 0.001$, chi-squared test) – and within each treatment. Table A2 in the appendix shows results from OLS regressions where treatment dummies are interacted with gender. We do not find significant differences in treatment

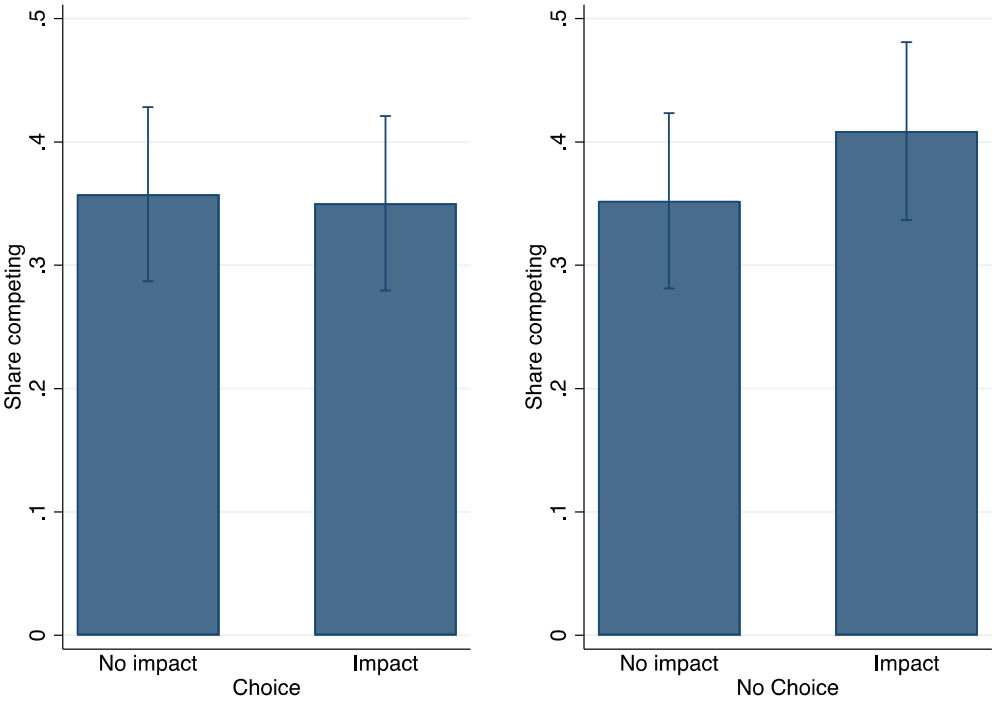

Fig. 1 Between-subject experiment: Competition entry rates by treatment
Note: The figure shows the proportion of participants who choose to compete in each of the four treatments in the between-subject experiment. Error bars show 95 percent robust confidence intervals obtained from regressions of a competition dummy on treatment dummies.

Table 4. Regression analysis: effect of between-subject treatments on choosing competition

	(1)	(2)	(3)	(4)
	Choice		*No Choice*	
Impact	0.053	0.025	−0.003	0.061
	(0.051)	(0.044)	(0.051)	(0.044)
Risk-taking		0.103***		0.085***
		(0.011)		(0.013)
Confidence		0.011		0.042***
		(0.014)		(0.013)
Relative performance		0.176**		0.051
		(0.084)		(0.083)
Female		−0.169***		−0.150***
		(0.047)		(0.048)
N	356	356	354	354

Note: The table reports results from OLS regressions on a dummy for choosing competition. Risk-seeking is measured on a scale from 0 to 10. Confidence is measured on a scale from 1 to 10 corresponding to the believed performance decile. Relative performance is the rank in the baseline round normalized to a range of 0–1. Robust standard errors in parentheses; *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

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effects between men and women, which implies that the gender gap in competing does not vary significantly across treatments.

4.2. Within-subject experiment

In this section, we use data from the within-subject experiment to study whether fairness concerns matter for people's willingness to compete. We first examine whether, overall, fairness considerations or self-interest considerations dominate when deciding whether to compete. We then use the within-subject nature of this experiment to classify participants into types according to their competition choices. We document how competition types vary by gender, willingness to take risks, competitiveness, and willingness to sabotage the performance of an opponent.

Fig. 2 shows how the share of participants choosing competition varies across the six conditions. The left panel compares the willingness to compete when facing a randomly chosen opponent (even playing field) to when the decision-maker receives a bonus of 20 seconds (advantage) or a penalty of 20 seconds (disadvantage). Moving from the even playing field to a situation where one has an advantage, fairness considerations and self-interest considerations pull in opposite directions. On an even playing field, 45 percent of participants choose competition. With an advantage, the proportion of participants who are willing to choose competition for themselves and their opponent increases to 53 percent ($p < 0.001$). These findings suggest that self-interest considerations dominate fairness considerations, in the sense that relative to the baseline condition, more people are enticed to compete by the advantage than are pushed away from competing by the unfairness. Moving from the even playing field to a situation where one has a disadvantage, fairness considerations and self-interest considerations pull in the same direction, making competition less attractive. In line with this, we observe a drop in the share of participants choosing to compete to 29 % ($p < 0.001$).

The right panel of Fig. 2 compares competition entry against an opponent of similar ability (equality of match) to competition entry when participants know their opponent is weaker or stronger. When the opponent is known to be of similar ability, 41 percent of participants choose competition. When the opponent is known to be weaker, the share of participants willing to choose competition

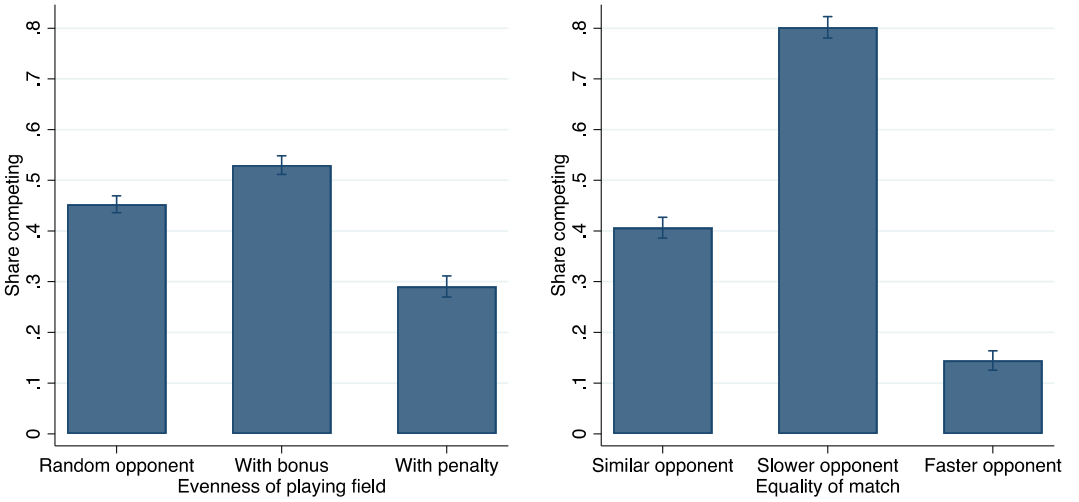

Fig. 2 Within-subject experiment: competition entry rates by treatment

Note: The figure shows the proportion of participants who choose competition in each condition of the within-subject experiment. Error bars show 95 percent confidence intervals obtained from regressions of a competition dummy on decision scenario dummies, controlling for individual fixed effects (standard errors are clustered at the individual level).

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strongly increases to 80 % ($p < 0.001$). Thus, we again observe that for a significant share of participants, self-interest considerations appear to dominate fairness considerations.[14] Conversely, the left panel of Fig. 2 shows that when facing a stronger opponent, there is a significant drop in the share of participants choosing competition. Only 14 percent choose to compete in this condition ($p < 0.001$).[15]

We now turn to a within-individual analysis of the competition choices. We first decompose the aggregate effect of introducing an advantage into (i) participants who choose competition in the baseline but refrain when they have an advantage, and (ii) participants who do not compete in the baseline conditions but are enticed to choose competition for themselves and their opponent when they have advantage. We find that 90 percent of participants who choose competition against a random opponent are still willing to do so when they receive an advantage. Similarly, 94 percent of those who choose competition when faced with an opponent of similar ability also choose competition when faced with a weaker opponent. Hence, fairness considerations do outweigh self-interest considerations only for a small share of those who are willing to compete in the baseline conditions when they receive an advantage. We furthermore find that a significant share of participants who do not compete in the baseline conditions are enticed to compete when they receive an advantage. Notably, 71 percent of those who do not choose competition against an opponent of similar strength choose competition against a weaker opponent, showing that self-interest considerations dominate fairness considerations also for the majority of individuals who are not willing to enter the baseline competition. These results are visualized in Figure A4 in the appendix.

Table 5 reports the corresponding regression analysis.[16] In columns (1) and (4), we find that there is a significant increase in the willingness to compete when the decision-maker has an advantage (in terms of receiving a bonus or meeting a weaker opponent), and a significant decrease in the willingness to compete when the decision-maker has a disadvantage. In columns (2)–(3) and (5)–(6), we decompose these aggregate effects based on whether the decision-maker competes in the baseline condition. Among those who compete in the baseline condition, we document a decrease in the willingness to compete when at an advantage, which shows that some participants assign weight to fairness considerations. Conversely, for those decision-makers who do not compete in the baseline condition, we document an increase in the willingness to compete when at an advantage, which shows that self-interest outweighs fairness for some participants. The latter effect outweighs the former, resulting in an overall increase in the willingness to compete when the decision-maker is advantaged. When participants are at a disadvantage, we estimate a large decrease in the willingness to compete among the decision-makers who compete in the baseline condition, in line with both self-interest and fairness making it less attractive to compete. We also find a small but significant increase in the willingness to compete when at a disadvantage among those who do not compete at baseline, which shows that some participants make choices that are not consistent with the conceptual framework.

We can now establish our second main result:

[14] Another piece of evidence that supports the conclusion that fairness concerns are trumped by self-interest considerations in the within-experiment is that when deciding whether to choose competition against a randomly selected opponent, 97 percent of participants who believe that they are in the top performance decile – and therefore believe they have a greater than 90 percent chance of winning – are willing to do so (Figure A2 in the appendix shows competition rates against a randomly selected opponent by believed performance decile). Note that the typical finding from experiments based on the Niederle-Vesterlund design that more confident subjects are more likely to compete cannot tell us anything about fairness because the competition decision does not affect the payoffs of others.

[15] In Figure A3 in the appendix, we show tournament entry rates in each condition separately by gender. The most striking result is that women are nearly as likely as men to compete when they are assured that they will face a weak opponent while in all other treatments, they are much less likely than men to choose competition.

[16] See Table A3 in the appendix for a regression analysis of how the choices in the within-subject experiment relate to background characteristics.

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Table 5. Within-subject experiment: Regression analysis of manipulating the evenness of the playing field/equality of match on the willingness to compete

	(1) All	(2) Compete in baseline	(3) Individual in baseline		(4) All	(5) Compete in baseline	(6) Individual in baseline
	Evenness of playing field				*Equality of match*		
With bonus	0.077*** (0.014)	−0.105*** (0.016)	0.228*** (0.020)	Weaker oppo-nent	0.395*** (0.019)	−0.058*** (0.013)	0.706*** (0.021)
With penalty	−0.162*** (0.017)	−0.455*** (0.026)	0.080*** (0.013)	Stronger oppo-nent	−0.262*** (0.017)	−0.696*** (0.026)	0.036*** (0.009)
Constant	0.453	1	0		0.406	1	0
N	802	363	439		802	326	476

Note: The table reports results from OLS regressions on a dummy for choosing to compete. All regressions control for individual fixed effects. The regressions in columns 1 to 3 include observations from the first three experimental conditions where competition occurs against a randomly selected opponent and we vary whether the decision-maker receives a 20-second bonus or a 20-second penalty (in the initial decision, the decision-maker receives neither bonus nor penalty). The regressions in columns 4 to 6 include observations from the last three experimental conditions, where we vary the strength of the opponent. 'Similar' means the opponent's performance in the initial round was with ± 20 seconds of the decision-maker's performance. 'Slower' means the opponent was at least 20 seconds slower. 'Faster' means the opponent was at least 20 seconds faster. Standard errors are clustered at the individual level; *p < 0.1, **p < 0.05, ***p < 0.01.

Result 2: *Self-interest considerations on average trump fairness considerations when participants choose whether to compete. Most participants who compete in the baseline conditions are also willing to compete when they have an advantage, and many participants who do not compete in the baseline conditions are willing to compete when they have an advantage.*

The within-subject nature of the experiment allows us to classify participants based on the choices they make under the six different scenarios. Based on the framework introduced in Section 3, 6.4 percent of the participants reveal a concern for fairness in their competition choices, by competing in the baseline condition but not when they have an advantage.[17] In contrast, 87 percent of the participants make choices that are consistent with them only assigning weight to self-interest considerations. Only 6.6 percent of the participants make choices that are inconsistent with the conceptual framework.

To provide a more detailed analysis of how competition choices relate to the willingness to sabotage, we disaggregate the participants classified as self-interested into the following types[18]:

Never: never choose competition

Advantage only (1): choose competition in one condition where they have an advantage but not in any of the other conditions

[17]This corresponds to 12 percent of the participants who compete in at least one of the two baseline conditions (417 out of 752 participants), which is the group of participants for which we potentially could have identified a concern for fairness.

[18]In Figure A5 in the appendix, we show the distribution of types separately for men and women. There is no significant gender difference in showing fairness concerns (5.9 percent of men and 7.3 percent of women are classified as fair; $p = 0.449$, chi-squared test). What jumps out, however, is that men are much more likely to always compete (14.1 percent of men versus 2.6 percent of women) and less likely only to compete when they are at an advantage (22.4 percent of men versus 37.8 percent of women). The difference in the distribution of competition types across gender is highly statistically significant ($p < 0.001$; chi-squared test). In Figure A6 in the appendix, we show how the distribution across competition types differs according to participants' self-scored risk-taking, self-scored willing to compete (which is significantly, but far from perfectly correlated with self-scored risk-taking in our data), believed performance in the initial round, and actual performance in the initial round. We observe that people who are more competitive, more risk seeking, or have a higher (actual or believed) performance in the initial round are more likely to always compete and less likely to never compete or only compete with an advantage. The likelihood of being classified as fair does not vary much with the four characteristics.

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Advantage only (2): choose competition in both conditions where they have an advantage but not in any of the other conditions

Mixed: choose competition in at least one condition where they have an advantage but also in at least one other condition

Always: always choose competition

We find that 16.5 percent of participants never compete (Never). Some participants only compete with an advantage: 19.8 percent do so once (Advantage only (1)), and 8.2 percent do so twice (Advantage only (2)). 39.2 percent compete both with and without advantage (Mixed) and 9.8 percent compete in all six scenarios (Always).

In the sabotage choice, participants could tilt a competitive environment in their favor by imposing a time penalty on the opponent. Again, we observe that self-interest considerations on aggregate dominate fairness considerations, with 61 percent of the participants choosing to sabotage the performance of their opponent. This, however, also shows that a large minority of the participants assign at least some weight to fairness considerations in a competitive environment since they do not exploit a costless opportunity to receive an advantage.[19] The left panel of Fig. 3 reports the share of participants who sabotage by whether they were classified as fair or self-interested based on their competition choices. We observe that a significantly lower share of the fair participants chooses to sabotage than of the self-interested participants, 40 percent versus 60 percent ($p < 0.001$). Hence, showing a concern for fairness in the competition choices is predictive of not acting unfairly in the sabotage choice. However, some participants who are classified as fair based on their competition choices do sabotage. This may reflect that they make a trade-off between fairness and self-interest, and that self-interest considerations outweigh fairness considerations in the sabotage choice but not in the competition choice.

The right panel of Fig. 3 shows that the propensity to sabotage the opponent varies strongly across the competition types. Participants who never compete or always compete are as unlikely to sabotage as fair participants. On the other hand, participants who only compete when they have an advantage are much more likely to sabotage, with 69 percent of those who do so once and 82 percent who do so twice choosing the sabotage option.

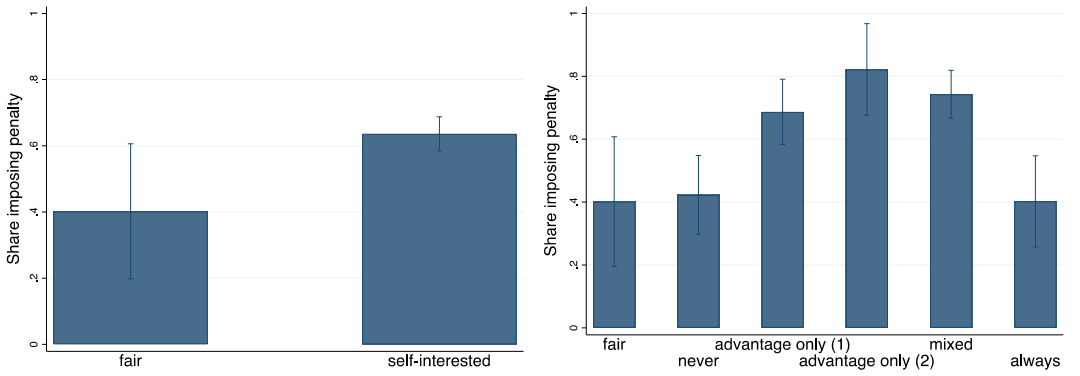

Fig. 3 Sabotage decision by competition type

Note: The figure shows the proportion of participants who sabotage their opponent's performance by whether they are classified as fair or self-interested based on the competitiveness choices (left panel) and disaggregated for the different self-interested types (right panel). Error bars show 95 percent confidence intervals obtained from a regression of a sabotage dummy on group dummies, controlling for dummies for the treatment in the between-subject experiment.

[19] In accordance with past studies (Dato & Nieken, 2014, 2020), women are significantly less likely to sabotage: 66 percent of men and 55 percent of women choose to give themselves an advantage ($p = 0.029$; chi-squared test).

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Table 6. Correlation between competition choices and the sabotage choice

	(1)	(2)	(3)	(4)
#baseline competition	−0.009		−0.032	−0.029
	(0.040)		(0.042)	(0.043)
#advantaged competition	0.192***		0.189***	0.192***
	(0.040)		(0.040)	(0.040)
#disadvantaged compet.	−0.187***		−0.205***	−0.211***
	(0.040)		(0.041)	(0.041)
Female		−0.108*	−0.118**	−0.112**
		(0.056)	(0.053)	(0.053)
Risk-taking		0.006	0.014	0.019
		(0.014)	(0.015)	(0.015)
Competitiveness		0.003	0.008	0.007
		(0.015)	(0.015)	(0.015)
Performance initial round		−0.001	0.008	0.007
		(0.014)	(0.013)	(0.013)
Confidence		−0.008	−0.008	−0.009
		(0.015)	(0.014)	(0.014)
Treatment in part 1				x
N	395	395	395	395

Note: The table reports results from OLS regressions on a dummy for choosing sabotage. 'Treatment in part 1' means dummies for the treatment in the between-subject experiment that preceded the within-subject experiment. Robust standard errors in parentheses; *p < 0.1, **p < 0.05, ***p < 0.01.

The relationship between competition choices and willingness to sabotage is explored in more detail in Table 6. There, we regress a sabotage dummy on the number of times a participant chose the tournament in the two baseline conditions where competition is even, when they had an advantage, and when they had a disadvantage. Each time a participant chose competition when at an advantage is associated with a greater likelihood by 19 percentage points of choosing to sabotage. On the other hand, each time a participant chose competition when at a disadvantage is associated with a lower likelihood by 19 percentage points. Decisions to compete in the even conditions are uncorrelated with the sabotage choice. These coefficients hardly change when adding controls for risk preferences, competitiveness, gender, performance in the initial round, and confidence. Interestingly, the questionnaire measure of competitiveness is uncorrelated with the sabotage choice, again confirming that it is not competitiveness per se but the willingness to compete with an advantage that correlates with lower concern for fairness. We summarize this discussion in the following result:

Result 3: *Only a small minority of participants demonstrate a concern for fairness in their competition choices. These fair participants are also less willing to sabotage their opponent. Among self-interested participants – who do not demonstrate fairness concerns in their competition choices – those specifically drawn to competitions where they are advantaged are more likely to sabotage relative to participants who always or never compete.*

5. Conclusion

We study how people trade off fairness concerns and self-interest when choosing whether to enter a competition. In a between-subject experiment, we show that average willingness to compete is unaffected by whether competing (and potentially winning) imposes a cost on another participant. This result holds regardless of whether the opponent self-selected into competition or had no choice

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about whether to compete. In a within-subject experiment, we show that the majority of participants are willing to unilaterally choose winner-takes-all competition over sharing a prize in situations where they have an advantage over their opponent or when they know their opponent is substantially weaker. The picture that emerges from the two experiments is that fairness concerns do not play a dominant role in determining people's willingness to compete.

The within-subject experiment allows us to classify participants based on their competition choices. Few participants who compete in the baseline competitions refrain from competition when they have an advantage, indicating that fairness concerns play a limited role in these decisions. Conversely, many participants are willing to compete only when they have an advantage. As in the previous literature, we find a substantial gender difference in willingness to compete in almost all experimental conditions. However, we find that women are no less likely than men to choose competition against an opponent who is known to be weak. We also elicit willingness to sabotage an opponent. Refraining from a costless opportunity to sabotage means giving up a gain in expected earnings in favor of fairness concerns. Willingness to refrain from sabotage is strongly related to the competition decisions: Among participants who show fairness concerns in their competition choices, the majority do not sabotage; among people who compete only or mainly when at an advantage, only a minority are willing to refrain from sabotaging.

In modern societies, citizens are part of many competitions, whether voluntary or not. Money and status frequently depend on the outcomes of competitions for the best schools, universities, jobs, and social networks. The intensity and fairness of these competitions, however, vary considerably across societies. Often, those with the most influence are also the ones who profit the most from competition; because they have advantages due to better family resources, health, and social networks. Extrapolated to a social context, our results indicate that – when in power – most people are willing to impose a winner-takes-all competition on others if they know them to be weak or if they obtain an exogenous advantage. It is important to keep in mind, though, that the sample consists entirely of business-school students – a relevant population in terms of being likely future corporate decision-makers, but not a representative sample of the population.

Our study also contributes to the large literature on willingness to compete and the literature linking willingness to compete to labor market outcomes. The null result from our between-subject experiment is good news for the external validity of experimental measures of willingness to compete. We show that competition choices – and the gender gap in choosing competition – elicited in a richer, more realistic environment are very similar to those elicited with the standard method in a choice environment that eliminates social concerns.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/eec.2025.10011.

Acknowledgements. We are grateful to Markus Andresen, Henriette Ankerud, Fehim Ceren Ay, Firuze Citak, Martin Digranes, Andreas Fossan, Maria Hansteen, Bohdan Haponiuk, Susann Haugen, Nora Huseby, Tone Jelsness, Raunak Karanjit, August Klemp, Elene Kolstad, Stefan Meisner, Vilde Nakkim, Axel Opedal, Liv Torill Søvde Ravnskog, Daria Ruzaeva, Charlotte Schwaiger, Johannes Solberg, Nora Sværen, and Olve Wold for excellent research assistance.

Funding statement. We are thankful for the financial support from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No 788,433) and the Research Council of Norway through its Centres of Excellence Scheme, FAIR project No 262,675.

Data availability statement. The data and materials are available at https://doi.org/10.7910/DVN/TMCB3W.

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Cite this article: Buser, T., Cappelen, A. W., & Tungodden, B. (2025). Fairness and willingness to compete. *Experimental Economics*, 1–19. https://doi.org/10.1017/eec.2025.10011