

Ger J Exerc Sport Res
<https://doi.org/10.1007/s12662-022-00827-w>
 Received: 21 May 2021
 Accepted: 29 April 2022

© The Author(s) 2022



André Haas¹ · Hagen Wäsche¹ · Rita Wittelsberger² · Petra Nieken³ · Alexander Woll¹

¹ Institute of Sports and Sports Science, Karlsruhe Institute of Technology, Karlsruhe, Germany

² SRH University of Applied Health Sciences, Karlsruhe, Germany

³ Institute of Management, Karlsruhe Institute of Technology, Karlsruhe, Germany

Social skills and sports: Pupils of an elite school of sports are more competitive and cooperative

Introduction

It is frequently conjectured that sports participation does not only improve individuals' physical and mental health, but also positively affects other domains of life. One prominent example is the labor market where physically active individuals are reported to perform better than inactive individuals regarding both income and job quality (e.g., Cornelißen & Pfeifer, 2009; Lechner, 2009; Cabane, 2011; Hyytinen & Lahtonen, 2013; Lechner & Sari, 2015; Lechner, 2015; Cabane & Lechner, 2016). Besides higher levels of productivity due to improved health, the setting in which sports participation is embedded may also foster qualities which prove advantageous beyond sports, e.g., perseverance, social interactions, or coping with stress. Although participants in the present study are several years away from entering the labor market, there is broad evidence on the importance of skills acquired during childhood and adolescence for outcomes in later life, including labor market success (see, e.g., Almlund, Duckworth, Heckman, & Kautz, 2011, for an exhaustive review of the literature). Moreover, sports participation in adolescence can prove advantageous when applying for an apprenticeship after finishing school (Piopiunik, Schwerdt, Simon, & Woessmann, 2020) and is also found to be positively related with labor market participation and job characteristics in the late

20s and early 30s, respectively (Cabane & Clark, 2015).¹

Sports, in particular at a professional level, is frequently associated with competition. At the same time, cooperation of individuals regularly poses a crucial determinant for success—not only in team sports. At first glance, this may appear contradictory: While competition is a zero-sum game with mutually exclusive goals from the participants' point of view as the prize is fixed ex-ante, cooperation is usually achieved by overcoming a social dilemma, i.e., individuals sacrifice their personal benefit to augment the outcome for the entire group (Sethi, 2010). Nevertheless, both competition or cooperation are vital elements of success in sports and other domains of life, although not simultaneously. This notion is reflected by the portmanteau “coopetition” which has been introduced to management literature by Nalebuff and Brandenburger (1996; see also Nickisch & Nalebuff, 2020). In terms of individual labor market outcomes, both competitiveness and cooperativeness may be valuable—depending on the specific situation—as (a) firms increasingly rely on team work and (b) promotions are frequently based on tournament-like rela-

tive performance evaluations (Lazear & Shaw, 2007).

The present paper focuses on the institutional setting of an elite school of sports (ESS) rather than on individual levels of sports participation. These institutions are part of the German sport system and provide the opportunity to reconcile compulsory school attendance with extensive practicing necessary to pursue a career in professional sports and participation in (inter-)national competitions (DOSB, 2021). Although this track is demanding, there is no evidence that individuals attending an ESS perform academically worse than students at regular schools or suffer from mental conditions due to stress (Güllich & Richartz, 2016; Breithecker & Brandl-Bredenbeck, 2017). To contribute to the literature studying the particular group of pupils attending an ESS, we examine competitive and cooperative behavior in children attending an ESS as compared to their peers attending regular upper secondary schools. Our research is guided by the following directed hypotheses:

(H1). ESS students are more cooperative than students attending regular schools.

(H2). ESS students are more competitive than students attending regular schools.

There are previous studies utilizing methods from experimental economics which report differences in behavior between individuals playing sports and those not playing sports regarding, in particular, cooperativeness (Celse et al.,

¹ Although the labor market outcomes might be considered far reaching, our assumption is based on several studies (Celse, Nicolas, & Schilling, 2017; Eber & Willinger, 2004; Eber, 2006; Fallucchi, Nosenzo, & Reuben, 2020) that are built on similar assumptions with regard to labor market outcomes.

Table 1 Competitiveness: choice of tournament scheme

	Probit			
	(1)		(2)	
	Coeff	95% CI	Coeff	95% CI
ESS	0.26**	[0.07, 0.46]	0.29**	[0.11, 0.46]
Female	–	–	–0.35***	[–0.49, –0.22]
Intercept	–0.18	[–0.37, 0.02]	0.17	[–0.07, 0.42]
Observations	184	–	184	–
AIC	252.06	–	230.07	–

Significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Average marginal effects

ESS elite school of sports, 95% CI 95% confidence interval

Table 2 Cooperativeness: contributions to the collective account

	OLS				Tobit	
	Coeff	95% CI	Coeff	95% CI	Coeff	95% CI
ESS	0.9***	(0.41, 1.39)	0.88***	(0.39, 1.37)	0.98***	(0.45, 1.51)
Female	–	–	0.24	(–0.11, 0.59)	–	–
Intercept	2.41***	(2.22, 2.59)	2.31***	(2.08, 2.54)	2.39***	(2.18, 2.6)
Observations	184	–	–	–	184	–
Left-censored (limit: 0)	–	–	–	–	11	–
Uncensored	–	–	–	–	160	–
Right-censored (limit: 5)	–	–	–	–	13	–
AIC	585.75	–	585.87	–	613.94	–

Significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Tobit estimates: average marginal effects

ESS elite school of sports, 95% CI 95% confidence interval

2017) and competitiveness (Eber & Willinger, 2004; Eber, 2006; Fallucchi et al., 2020). It is important to emphasize that these studies rely on correlations and do not draw causal conclusions on the effect of sports participation; the same applies to our approach which focuses on the institutional setting of the ESS in the first place. More precisely, the goal of the present paper is to investigate competitive and cooperative behavior among students attending an ESS and regular upper secondary schools, respectively. Our initial point of view is that there are no differences between both groups.

Procedures

The results presented below are based on data gathered as baseline for a study which examines the capacity of a sports-based intervention in fostering personal and social skills. Participants were children aged 10–13 years ($N = 184$; $\text{mean}_{\text{Regular schools}} = 11.7$ years (standard deviation $[\text{SD}]_{\text{Regular schools}} = 0.46$ years);

$\text{mean}_{\text{ESS}} = 11.7$ years ($\text{SD}_{\text{ESS}} = 0.28$ years)); difference statistically not significantly different from zero ($U(n_{\text{Regular schools}} = 158, n_{\text{ESS}} = 26) = 2246, p > 0.1$, two-sided Mann–Whitney U test) attending four regular upper secondary schools and one ESS in the same city in Germany. The experiments utilized to gather data were conducted on class level. At the time of the study (December 2016), the composition of the classes had been in effect for approximately one and a quarter years. Although the outcomes were based on both individuals' decisions and decisions by other students within the same class, it has to be noted that participants were guaranteed anonymity, i.e., individual decisions were not disclosed at any time. This paper reports the results only of the first wave of a larger study, prior to the intervention in the treatment group (for details, see Haas et al., 2021b, Woll et al., 2018; see also our companion paper Haas et al., 2021a, which reports results on the longitudinal assessment of the intervention on cooperative behavior on

students at regular schools). The study was approved by the superintendent of the local school district and the Board of Ethics of the Karlsruhe Institute of Technology. To obtain measures of various preferences and traits, we utilize experimental methods which are established in economics (see, e.g., Sutter, Zoller, & Glätzle-Rützler, 2019, for a comprehensive review on results of economic experiments conducted with children and adolescents). The prominent feature of this approach is the use of monetary incentives which induce participants to respond truthfully (Bardsley et al., 2010). In the present paper, we limit the scope to competitive and cooperative behavior.

To study individuals' competitiveness, they were asked to carry out a real-effort task which consisted in replacing letters of a batch of words by numbers for 2 min (adopted from Erkal, Gangadharan, & Nikiforakis, 2011). The number of correctly enciphered letters provided a signal s_k of individual k 's effort. Prior to the working stage, they were asked to choose between two compensation schemes, either a piece-rate or a tournament prize. The piece-rate scheme yielded a fixed compensation of 3 tokens for each correctly enciphered letter; thus, an individual's final payoff was $3 \times s_k$ tokens (capped at 300 tokens). The payoff under the tournament scheme, however, was based on the comparison of individual k 's number of correctly enciphered letters, s_k , and the number of correctly enciphered letters s_l of another individual l who had also chosen the tournament scheme. The individual with the higher number of correctly enciphered letters received the winner prize of 600 tokens and the other individual received the loser prize of 0 tokens; ties were broken randomly. Since the payoff in the tournament scheme was based on the relative performance of two individuals and features a prize spread which imposes strong incentives for winning due to the substantial difference between the winner and loser prize, individuals who chose the tournament scheme were deemed competitive.

A linear public good game was utilized to study individuals' willingness to cooperate. Each group consisted of four

Social skills and sports: Pupils of an elite school of sports are more competitive and cooperative

Abstract

It is frequently observed that individuals who actively practice sports also do well in other domains of life, e.g., the labor market. While the underlying mechanisms are not yet fully understood, it is often argued that sports participation is embedded in a setting which fosters qualities which prove advantageous beyond sports. In the present paper, we examine competitive and cooperative behavior in children aged 10–13 years. Rather than on individual levels of sports participation, the focus is on the institutional setting of an elite school of sports (ESS) as compared to regular upper secondary schools. To obtain measures for competitiveness and cooperativeness, we utilize experimental methods which are established in economics. Our results show that ESS students are both more competitive and more cooperative than their counterparts at regular schools.

Keywords

Cooperation · Competition · Cooperation ·
 Elite school of sports · Economic experiment

individuals (indexed $i = 1, \dots, 4$) who received an endowment of 120 tokens each. They decided independently and simultaneously how to allocate their individual endowment to a private and a collective account, respectively (in increments of 24 tokens). Contributions to the collective account by individual were denoted by $c_i \in \{0, 24, 48, 72, 96, 120\}$. Tokens which were not contributed to the collective account, i.e., $120 - c_i$, were transferred to the individual's private account. Each token in the private account yielded a payoff of 2 tokens to each individual. For each token allocated to the collective account, every individual of the group received a payoff of 1 token. Thus, individual i 's payoff π_i (in tokens) was denoted by

$$\pi_i = 2 \times (120 - c_i) + (c_1 + c_2 + c_3 + c_4)$$

From an individual perspective, a contribution of 1 token to the collective account yielded a payoff on 1 token, while the same contribution to the private account yielded a payoff of 2 tokens. From the entire group's perspective, however, a contribution to the collective account yielded a payoff of 4 tokens. Hence, the individually optimal strategy—following the standard assumption in neoclassical economic theory of individuals striving to maximize their own material gain—was to allocate the entire endowment to the private account (i.e., $c_i = 0$ tokens), whereas the total payoff of the group was maximized when all individuals contributed their entire endowment to the collective account (i.e., $c_i = 120$ tokens)—which raised a social dilemma. Individuals who refrained from taking advantage of individual incentives and contribute to the collective account instead were, therefore, deemed cooperative.

At the end of the session, one experiment was chosen for payoff. Tokens earned in this particular experiment were converted into euros (€) at an exchange rate of 75 tokens = 1 €; additionally, each individual received a fixed participation fee of 2 €.

Results

Individuals' competitiveness is indicated by their choice of the tournament scheme in a real-effort task. At regular schools, 68 of 158 individuals (43%; 95% confidence interval [95% CI]: [36%, 51%]) are deemed competitive, whereas this characterization applies to 18 of 26 individuals (69%; 95% CI: [50%, 83%]) at the ESS. The difference in the propensity to choose the tournament scheme between the ESS and regular schools of 26%-points (95% CI: [6%-points, 44%-points]) is small (Cramér's $V = 0.18$; 95% CI: [0.04, 0.32]) and statistically significant ($\chi^2(1, N = 184) = 5.15$, $p = 0.02$). Yet, it is important to note that difference in the number of correctly enciphered letters between both groups is statistically not significantly different from zero (mean_{Regular schools} = 17.03 letters (SD_{Regular schools} = 8.71 letters); mean_{ESS} = 18.96 letters (SD_{ESS} = 7.37 letters); $U(n_{\text{Regular schools}} = 158, n_{\text{ESS}} = 26) = 1682$, $p > 0.1$, two-sided Mann-Whitney U test). Parametric results obtained by a univariate Probit regression (see specification (1) of **Table 1**) confirm this result as the coefficient of the binary variable representing the ESS is positive and statistically significant. Adding a dummy variable for female individuals in specification (2) yields a negative and statistically significant coefficient. In line with previous findings reported in the literature (Niederle & Vesterlund, 2007; Niederle, 2017), this indicates that female individuals are substantially less inclined to engage in competitions. Looking at the willingness to compete by gender and group in **Fig. 1** shows an interesting result: The share of female and male individuals who choose the tournament compensation scheme and, hence, are deemed competitive correspond by and large to observations frequently reported in comparable studies. It is worth noting, however, that in the ESS—even though a gender gap in competitiveness occurs—the overall propensity to compete is substantially higher than in regular schools. A visual inspection of **Fig. 1** reveals that female individuals at the ESS are about as competitive as male individuals at regular schools. The de-

sign of the current study, however, does not allow to disentangle the influence of environmental circumstances from selection effects.

Contributions to the collective account in the public good game indicate individuals' willingness to cooperate. For simplicity, we denote contributions in this section not in tokens but in coins (1 coin = 24 tokens), i.e., contributions range from 0 to 5 coins. An overview on average contributions in both groups is provided in **Fig. 2**. At regular schools, individuals contribute on average 2.41 coins (95% CI: [2.22 coins, 2.84 coins]) which corresponds to almost half of their initial endowment. This magnitude is in line with results from other experiments which frequently report contributions ranging from 40% to 60% of the initial endowment in one-shot

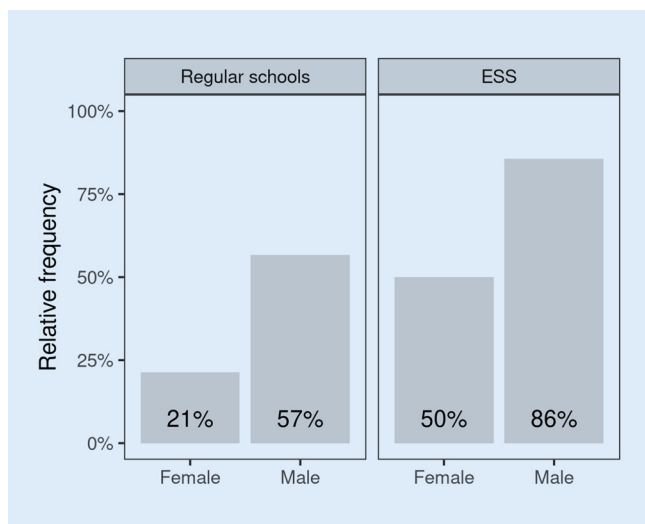


Fig. 1 ▲ Frequency of tournament scheme chosen by group and gender. ESS elite school of sports

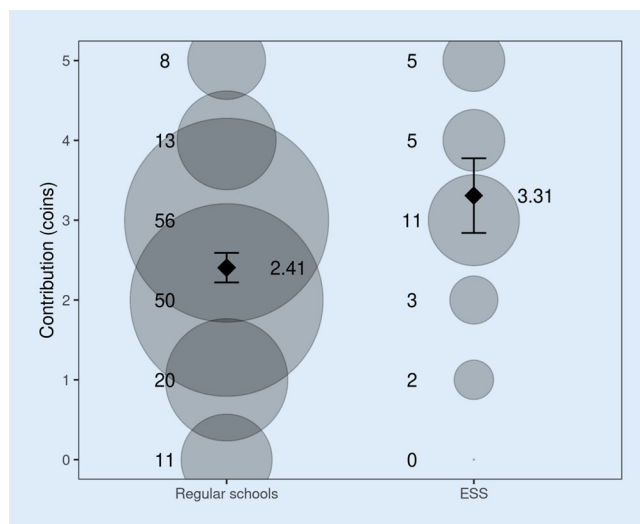


Fig. 2 ▲ Contributions to the collective account by group (with number of observations). Error bars indicate the 95% confidence interval. ESS elite school of sports

public good games and the first round of repeated public good games, respectively (Ledyard, 1995). Contributions to the collective account in the ESS amount to 3.31 coins (95% CI: [2.59 coins, 3.78 coins]) or about two-thirds of the initial endowment on average. This indicates that the individuals at the ESS are on average more inclined to cooperate than their counterparts at regular schools. A one-sided Mann–Whitney U test indicates that the mean contributions to the collective account at the ESS are statistically significantly higher than at regular schools ($U(n_{\text{Regular schools}} = 158, n_{\text{ESS}} = 26) = 1211.5, p < 0.001$). According to the measure by Algina, Keselman, and Penfield (2005), this effect is large ($\delta_t = 1.07$; 95% CI: [0.42, 1.47]). This finding is supported by a univariate linear regression reported in **Table 2** as the coefficient of the binary variable representing the ESS is positive and statistically significant. Unlike in the case of competitiveness, the coefficient of the binary variable representing female participants is not statistically significantly different from zero. Utilizing a Tobit model as robustness check yields the same result with regard to the propensity to cooperate between individuals attending the regular schools and the ESS.

Discussion

Our results show that individuals who attend the ESS behave differently from their counterparts at regular schools. ESS students in our study are both more competitive and more cooperative. Although this finding may seem contradictory at first glance, it can be justified by the fact that both properties provide a crucial prerequisite for success in sports—depending on the specific situation. Yet, it has to be noted that this study focuses on the institution of the ESS, not on individual levels of sports participation. From a methodological perspective, borrowing an approach from experimental economics links individuals' decision to real consequences by using variable payment. This alleviates the potential issue of demand effects which are difficult to avoid in self-answered questionnaires. Our results are subject to limitations: First, the cross-sectional nature of the data set does not allow us to infer causal conclusions. Second, only one ESS was part of the study; generalizations are, therefore, to be treated with caution. Third, other aspects such as more shared time in the ESS because of additional trainings could have an influence on the results. Fourth, since this paper is a brief research communication, we refrained from a comprehensive discussion of existing literature

that could shed light on further aspects of interest. Nevertheless, our study using incentivized economic experiments provides highly interesting results that should be further analyzed in future studies.

Corresponding address



André Haas
Institute of Sports and Sports Science, Karlsruhe Institute of Technology
Engler-Bunte-Ring 15,
76131 Karlsruhe, Germany
andre.haas@mailbox.org

Funding. Open Access funding enabled and organized by Projekt DEAL.

Declarations

Conflict of interest. A. Haas, H. Wäsche, R. Wittelsberger and P. Nieken, and A. Woll declare that they have no competing interests.

The studies involving human participants were reviewed and approved by the Board of Ethics of the Karlsruhe Institute of Technology. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Open Access. This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons li-

cence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Algina, J., Keselman, H.J., & Penfield, R.D. (2005). An alternative to Cohen's standardized mean difference effect size: A robust parameter and confidence interval in the two independent groups case. *Psychological Methods, 10*(3), 317–328. <https://doi.org/10.1037/1082-989X.10.3.317>.
- Almlund, M., Duckworth, A.L., Heckman, J., & Kautz, T. (2011). Personality psychology and economics. In E. A. Hanushek, S. Machin & L. Woessmann (Eds.), *Handbook of the economics of education* (pp. 1–181). Elsevier. <https://doi.org/10.1016/B978-0-444-53444-6.00001-8>.
- Bardsley, N., Cubitt, R., Loomes, G., Moffatt, P., Starmer, C., & Sugden, R. (2010). *Experimental economics: rethinking the rules*. Princeton University Press.
- Breithecker, J., & Brandl-Bredenbeck, H.P. (2017). Die Eliteschule des Fußballs: Eine Längsschnittstudie in stress-theoretischer Perspektive zur Verbindung von Schule und Leistungssport. *Discourse. Journal of Childhood and Adolescence Research, 4*, 469–475. <https://doi.org/10.3224/diskurs.v12i4.07>.
- Cabane, C. (2011). Do sporty people have access to higher job quality? In P. Rodríguez, S. Késenne & B. R. Humphreys (Eds.), *The economics of sport, health and happiness: the promotion of well-being through sporting activities* (pp. 126–150). Edward Elgar Publishing. <https://doi.org/10.4337/9780857930149>.
- Cabane, C., & Clark, A.E. (2015). Childhood sporting activities and adult labour-market outcomes. *Annals of Economics and Statistics, 119/120*, 123–148. <https://doi.org/10.15609/annaeconstat2009>.
- Cabane, C., & Lechner, M. (2016). Physical activity of adults: a survey of correlates, determinants, and effects. *Journal of Economics and Statistics, 235*(4–5), 376–402. <https://doi.org/10.1515/jbnst2015-4-504>.
- Celse, J., Nicolas, M., & Schilling, P. (2017). Are athletes more cooperative than nonathletes? A laboratory experiment. *Managerial and Decision Economics, 38*(8), 1248–1261. <https://doi.org/10.1002/mde.2862>.
- Cornelißen, T., & Pfeifer, C. (2009). Sport und Arbeitseinkommen—Individuelle Ertragsraten von Sportaktivitäten in Deutschland. *Review of Economics, 59*(3), 344–255. <https://doi.org/10.1515/roe-2008-0305>.
- DOSB (2021). Eliteschule des Sports. <https://eliteschulen.dosb.de/>. Accessed 1 Nov 2021.
- Eber, N. (2006). Les sportifs sont-ils (vraiment) différents? Une approche par l'économie expérimentale. *Revue Économique, 57*(3), 623–634.
- Eber, N., & Willinger, M. (2004). Le comportement économique des sportifs: Une étude par l'économie expérimentale. *Revue Juridique et Économique du Sport, 72*, 7–16.
- Erkal, N., Gangadharan, L., & Nikiforakis, N. (2011). Relative earnings and giving in a real-effort experiment. *American Economic Review, 101*(7), 3330–3348. <https://doi.org/10.1257/aer.101.7.3330>.
- Fallucchi, F., Nosenzo, D., & Reuben, E. (2020). Measuring preferences for competition with experimentally validated survey questions. *Journal of Economic Behavior & Organization, 178*, 402–423. <https://doi.org/10.1016/j.jebo.2020.07.028>.
- Güllich, A., & Richartz, A. (2016). Leistungssport im Kindes- und Jugendalter: Ein Update. *Sportunterricht, 65*(2), 49–54. <https://www.hofmannverlag.de/pdf/archiv/sportunterricht/2016/Sportunterricht-Ausgabe-Februar-2016.pdf>.
- Haas, A., Wäsche, H., Wittelsberger, R., Nieken, P., & Woll, A. (2021a). *Cooperation in the classroom: An experimental assessment of skill acquisition through physical education* [submitted for publication].
- Haas, A., Wittelsberger, R., Wäsche, H., Woll, A., & Nieken, P. (2021b). Utilizing incentivized economic experiments to test for social skills acquisition through physical education: Study protocol of the *Movigen* project. *Frontiers in Sports and Active Living, 3*, Article 587764. <https://doi.org/10.3389/fspor.2021.587764>.
- Hyytinen, A., & Lahtonen, J. (2013). The effect of physical activity on long-term income. *Social Science & Medicine, 96*, 129–137. <https://doi.org/10.1016/j.socscimed.2013.07.019>.
- Lazear, E.P., & Shaw, K.L. (2007). Personnel economics: the economist's view of human resources. *Journal of Economic Perspectives, 21*(4), 91–114. <https://doi.org/10.1257/jep.21.4.91>.
- Lechner, M. (2009). Long-run labour market and health effects of individual sports activities. *Journal of Health Economics, 28*(4), 839–854. <https://doi.org/10.1016/j.jhealeco.2009.05.003>.
- Lechner, M. (2015). *Sports, exercise, and labor market outcomes*. IZA World of Labor, Article 126. <https://doi.org/10.15185/izawol.126>.
- Lechner, M., & Sari, N. (2015). Labor market effects of sports and exercise: evidence from Canadian panel data. *Labour Economics, 35*, 1–15. <https://doi.org/10.1016/j.labeco.2015.04.001>.
- Ledyard, J.O. (1995). Public goods: A survey of experimental research. In J.H. Kagel & A.E. Roth (Eds.), *The handbook of experimental economics* (pp. 111–194). Princeton University Press.
- Nalebuff, B.J., & Brandenburger, A.M. (1996). *Co-opetition: A revolution mindset that combines competition and cooperation*. Crown Business.
- Nickisch, C., & Nalebuff, B.J. (2020). When to team up with your competition (No. 770) [Audio podcast episode]. In *HBR IdeaCast*. <https://hbr.org/podcast/2020/12/when-to-team-up-with-your-competition>. Accessed 17 May 2022.
- Niederle, M. (2017). Gender. In J.H. Kagel & A.E. Roth (Eds.), *The handbook of experimental economics* (pp. 481–562). Princeton University Press.
- Niederle, M., & Vesterlund, L. (2007). Do women shy away from competition? Do men compete too much? *Quarterly Journal of Economics, 122*(3), 1067–1101. <https://doi.org/10.1162/qjec.122.3.1067>.
- Piopiunik, M., Schwerdt, G., Simon, L., & Woessmann, L. (2020). Skills, signals, and employability. *European Economic Review, 123*, Article 103374. <https://doi.org/10.1016/j.eurocorev.2020.103374>.
- Sethi, R. (2010). Reciprocity and collective action. In S.N. Durlauf & L.E. Blume (Eds.), *Behavioural and experimental economics* (pp. 243–246). Palgrave Macmillan. <https://doi.org/10.1057/9780230280786>.
- Sutter, M., Zoller, C., & Glätzle-Rützler, D. (2019). Economic behavior of children and adolescents—A first survey of experimental economics results. *European Economic Review, 111*, 98–121. <https://doi.org/10.1016/j.eurocorev.2018.09.004>.
- Woll, A., Böttger, D., Wittelsberger, R., Haas, A., Nieken, P., & Wäsche, H. (2018). *Movigen: Ein Interventionskonzept zur Förderung sozialer Kompetenzen im Schulsport* (KIT Scientific Working Papers No. 100). Karlsruhe Institute of Technology. <https://doi.org/10.5445/IR/1000086350>.