

1 Predicting cooperation in competitive conditions: The role of sportspersonship, moral
2 competence, and emotional intelligence

3

4

Abstract

5 *Objectives:* The purpose of the present study was to examine the predictive capabilities of
6 sportspersonship, moral competence, and emotional intelligence on cooperation in varying
7 competitive conditions. *Design:* An experimental study was conducted, examining responses in a
8 prisoner's dilemma game with manipulated conditions. *Method:* Forty-three participants were
9 randomly assigned to an accumulative or competitive condition, in which they contested 10
10 rounds of choosing to cooperate or defect. *Results:* Whether the condition was accumulative or
11 competitive did not significantly predict cooperation. In the final round of each contest however,
12 cooperation was significantly reduced. Sportspersonship predicted a significant amount of
13 cooperation percentage, while final round cooperation was predicted by emotional intelligence.

14 *Conclusions:* Cooperation is in part determined by individual levels of sportspersonship in all
15 conditions except when actions are free of future consequence. In such conditions, emotional
16 intelligence appears to be a stronger indicator of cooperation. The implications of the study are
17 that researchers and practitioners should consider how to develop sportspersonship and
18 emotional intelligence to boost cooperation in various domains.

19

20 **Keywords:** Cooperation; Game Theory; Sportspersonship; Morality; Emotional Intelligence

1 Cooperation is essential for ensuring that individuals are able to work together to
2 maximise individual and team performance in a variety of domains. Despite this, research into
3 the personal characteristics beyond the Big 5 personality traits that predict cooperation is
4 relatively scarce. Simpson's paradox (1951) refers to findings demonstrating that most
5 participants choose to cooperate more than defect in a prisoner's dilemma game (Flood, 1952),
6 despite that to defect is more fruitful (Dawes & Thaler, 1988). There are several competing
7 explanations for observed cooperation. Chater, Vlaev, and Grinberg (2008) explain that people
8 will continue to cooperate because of the higher average payoff. Two further competing
9 explanations include strong reciprocity and evolutionary legacy perspective. Strong reciprocity
10 (e.g., Fehr & Gintis, 2007; Gintis, 2000) suggests that a social norm evolves whereby
11 cooperation is expected and therefore adhered to. In trying to extract the determinants of
12 cooperation, Yang, Li, and Zheng (2013) found that reciprocity, perceived control, and risk
13 taking all accounted for a relatively equal proportion of variance.

14 The strong reciprocity explanation has been vehemently rejected by some researchers.
15 Burnham and Johnson (2005) and Hagen and Hammerstein (2006) suggest that the only real
16 explanation for electing to cooperate is because they have not truly understood the game.
17 Rather, they propose that evolutionary legacy hypothesis means behavioural anomalies are
18 caused by human ancestral and modern conditions, whereby conserved brain systems misfire
19 to motivate behaviour that are no longer relevant to a modern society (Burnham & Hare,
20 2007). This theory has received partial support from Kanazawa and Fontaine (2013), who
21 found a positive correlation with general intelligence and defection.

22 The purpose of the present study was to examine the extent to which participants
23 cooperate or defect in a prisoner's dilemma game under varying conditions, and how this was

1 predicted by sportpersonship, moral competence, and EI. Research examining cooperation in
2 sport settings is scarce. One would expect that an individual's level of sportpersonship would
3 likely pre-dispose them towards cooperative behavior, but this has not previously been
4 empirically examined. To determine if sportpersonship is a meaningful predictor of
5 cooperation, we identified two concepts that have previously been identified as predictors of
6 cooperation and tested the extent to which sportpersonship was able to explain variance in
7 cooperation over and above these. Specifically, we assessed emotional intelligence, which
8 Nelissen, Dijker, and De Vries (2007) reported as indicative of cooperation, and moral
9 competence, which has been associated with cooperative moral decision making (Kutnick &
10 Brees, 1982).

11 Participants took part in an accumulative condition, whereby prizes were awarded
12 relative to total points accrued, or a competitive condition, whereby prizes were awarded relative
13 to league table position. The final round of each contest presented a situation whereby there was
14 no consequence. This represented the final round of a prisoner's dilemma match against an
15 opponent, where there is no opportunity for revenge tactics should a participant suffer from
16 defection. We hypothesized the following:

- 17 1. Participants cooperate more frequently in a cooperative condition than a competition
18 condition
- 19 2. Sportpersonship, EI, and moral competence significantly predict cooperation in
20 accumulative but not competitive conditions

21 We made no hypothesis regarding cooperation or the predictors of it in the final round of
22 each contest.

1 **Methods**

2 **Participants**

3 Forty-three participants (males = 32; females = 11) aged from 18 to 40 years ($M = 20.33$,
4 $SD = 3.60$), who indicated that they participated in competitive team ($n = 36$) and individual ($n =$
5 7) sports with an average playing experience of 10.86 years ($SD = 6.07$) volunteered to take part
6 in the study.

7 **Measures**

8 ***Sportpersonship*** was measured using the 24-item compliant and principled
9 sportpersonship scale (CAPSS; Perry et al., 2015). Subscales represent compliance towards
10 officials, towards rules, not legitimising injurious acts, respect for opponent, and game
11 perspective. Items are graded on a 4-point Likert-type scale anchored at 1 = *strongly disagree*
12 and 4 = *strongly agree*.

13 ***Trait EI*** was assessed using the 153-item trait emotional intelligence questionnaire
14 (TEIQue; Petrides & Furnham, 2003), which includes 15 facets of EI and four higher-order
15 factors; wellbeing, self-control, emotionality, and sociability. Participants are required to
16 respond to each item on a 7-point Likert-type scale from 1 = *completely disagree* to 7 =
17 *completely agree*.

18 ***Moral competence*** was assessed using the moral competence test (MCT; Lind, 1998,
19 2008), which presents participants with two moral dilemmas. Each dilemma presents a short
20 background story culminating in a moral action. The participant must then indicate the extent
21 to which they accept or reject ($-3 = I$ *strongly reject*, $+3 = I$ *strongly accept*) the action and six
22 arguments supporting and six rejecting arguments the protagonist's solution. Each argument
23 presents a moral orientation aligned to Kohlberg's stages of moralisation (1976). A moral

1 judgement competence score (C-score; 1-100) is calculated as an individual's total response
2 variation.

3 **Procedure**

4 Following ethical approval from a higher education institution in the UK, data
5 collection took part on four separate days, two of which were designated as accumulative, and
6 two were competitive. In the accumulative condition, participants received three pence for
7 every point they scored over the course of the day. In the competitive condition, the following
8 award structure was used: First: £50, Second: £25, Third: £10. Those who finished outside of
9 the top three places did not receive a prize. Points for cooperation (C) and defection (D) were
10 awarded as follows: CvC: 3,3; DvD: 2,2; CvD: 1,4; DvC: 4,1.

11 Between eight and 13 participants took part on each day. After providing informed
12 consent and completing the psychometric measures, participants were assigned to separate
13 holding rooms to ensure that they were not aware of their opponent. A round-robin tournament
14 then took place. Each fixture consisted of 10 rounds, each requiring the participants to choose
15 to cooperate or defect by holding up a card with a printed "C" or "D", both visible to the lead
16 researcher, would then read the results with appointed scores to both participants. In total,
17 there were 218 fixtures of 10 rounds each and therefore 2180 rounds in total. Each day took
18 approximately four hours to complete.

19 **Data Analysis**

20 Analyses included screening data, conducting an independent-samples and paired-
21 samples *t*-test to test condition and tactical effects respectively, and bivariate correlations
22 examined the strength of relationship between CAPSS subscales, EI, moral competence and
23 cooperation in both conditions. To examine the predictive properties of condition and personal

1 characteristics, cooperation was inserted as a dependent variable in a multiple linear regression
2 model. Given the moderate sample size for type of analyses undertaken, post-hoc power
3 analyses were conducted for each *t*-test and multiple regression and are reported as $1-\beta$.

4 **Results**

5 **Descriptive Statistics**

6 Tests for normality revealed no issues with skewness or kurtosis (< 2) for all dependent
7 variables. Internal consistency reached satisfactory levels for all variables ($\alpha \geq .70$). There were
8 no significant correlations with moral competence and any dimension from the CAPSS or the
9 TEIQue. Correlations between sportpersonship and EI are presented in Table 1. To correct for
10 type 1 error as a result of multiple comparisons in all statistical analyses, Benjamini-Hochberg q
11 was derived from calculating the False Discovery Rate (FDR; Benjamini & Hochberg, 1995).
12 The null hypothesis was rejected if and only if $p < q$ and the 95% confidence interval did not
13 contain zero. The strength of the relationships between sportpersonship factors and emotionality
14 was considered worthy of further exploration. Therefore, bivariate correlations were calculated
15 between sportpersonship factors and the emotionality subscales. Relationships existed
16 throughout the sportpersonship and emotionality correlation matrix but the largest relationships
17 were found between emotionality factors and game perception.

18 **Hypothesis 1: Condition Effects**

19 An independent-samples *t*-test examined the condition effects by testing for differences
20 in all dependent variables in accumulative and competitive conditions. Sportpersonship, moral
21 competence, and trait EI variables were included to screen for potential sampling effects. No
22 significant differences indicated that results were not brought about by one group coincidentally
23 obtaining individuals higher in sportpersonship, EI, or moral competence. The only significant

1 difference between groups was in sociability ($t(40) = 2.30, p < .05, d = .71, 1-\beta = .61$). Contrary
2 to the hypothesis, no significant differences were detected for cooperation between groups.
3 However, there was a significant difference ($t(28.20) = 2.85, p < .01, d = .87, 1-\beta = .79$) in the
4 final round, as cooperation was significantly higher in the accumulative condition. Similarly,
5 those in the accumulative condition were significantly more likely to cooperate after being
6 suckered in the previous round ($t(37) = 2.52, p < .05, d = .79, 1-\beta = .71$) than participants in the
7 competitive condition. Overall, a greater proportion of the total points available were achieved in
8 the accumulative condition than the competitive condition ($t(27.21) = 4.50, p < .001, d = 1.43, 1-$
9 $\beta > .99$). A paired samples t -test to examine the condition effects between the first round
10 cooperation and final round cooperation revealed a large significant difference ($t(42) = 8.74, p <$
11 $.001, d = 2.67, 1-\beta > .99$).

12 **Hypothesis 2: Sportspersonship, EI, and Moral Competence Effects**

13 Clear positive correlations between sportspersonship subscales and the overall
14 percentage of cooperation were evident, with all correlations significant except compliance
15 towards rules (Table 2). Although there was a trend to suggest a positive relationship between
16 sportspersonship and first round cooperation, there was not enough certainty to reject the null
17 hypotheses. There was no relationship between sportspersonship and cooperation after being
18 suckered. Moral competence correlated positively with cooperation but only significantly so
19 with first round cooperation. EI was positively correlated with cooperation in the final round.
20 The clearest relationship between cooperation and EI was on the emotionality subscale, which
21 as identified earlier, is most closely linked to sportspersonship.

22 To test the predictive capabilities of sportspersonship, moral competence, and EI
23 effects, while controlling for condition effects, we examined a linear multiple regression

1 model. The condition was entered at Step 1, moral competence and trait EI were entered at
2 Step 2, and sportspersonship was entered at Step 3 to determine the variance predicted by it
3 over and above other variables. In total, four regression models were examined (Table 3) with
4 overall, first round, final round cooperation as the dependent variables presenting a significant
5 effect after step 3 (cooperation percentage: $F(4, 37) = 5.44, p < .01, R^2 = .37, p < .01, 1-\beta >$
6 $.99$; first round: $F(4, 37) = 2.64, p < .05, R^2 = .22, p < .05, 1-\beta > .99$; final round: $F(4, 37) =$
7 $4.87, p < .01, R^2 = .35, p < .01, 1-\beta > .99$). The condition had no effect on overall or first round
8 cooperation, but explained a significant amount of variance in the final round cooperation
9 ($F(1, 40) = 7.51, p < .01, R^2 = .16, p < .01, \beta = -.45, 1-\beta = .73$). Moral competence explained
10 some variance in first round ($\beta = .27$) cooperation, but not with enough certainty to reject the
11 null hypothesis. Trait EI explained significant variance in final round cooperation ($\beta = .43$),
12 and sportspersonship explained a significant proportion of variance in overall cooperation ($\beta =$
13 $.54$).

14 Discussion

15 The primary purpose of this study was to examine the predictive capabilities of
16 sportspersonship, moral competence, and EI on cooperation in varying competitive conditions.
17 The results indicated that these characteristics had a greater influence on the cooperation than
18 situation factors, with the exception of when responding to being suckered. Essentially, in
19 accumulative and moderately competitive conditions, cooperation is reasonably well predicted
20 by sportspersonship. However, in a situation where there is no future consequence, EI is the
21 greatest predictor. It appears that emotionality is the gateway towards understanding cooperation
22 in such circumstances.

1 It was notable that the condition had no effect on overall or first round cooperation. This
2 suggests that the extent to which the situation is competitive does not influence how people
3 approach it, but it does impact on how they respond to events during competition. In first round
4 cooperation, moral competence, EI, and sportpersonship all predicted a statistically insignificant
5 amount of variance. However, in the final round of each game, emotional intelligence became
6 the key indicator. This suggests that moral decision-making is governed more by how people
7 engage with emotion when, at least in competitive game scenarios, they are in a vulnerable
8 position.

9 Sportpersonship, moral competence, and EI are complex psychological structures,
10 requiring a level of reflection that demonstrates sophisticated cognitive functioning. They are
11 also all positively associated with cooperation. This result, plus the finding that cooperation
12 deteriorates with competition, questions Burnham and Hare's (2007) suggestion that
13 cooperation is a lack of understanding of the situation, although the increased reliance upon EI
14 in the final round could be construed as indicative of logical misfiring. The significance of
15 empathy means that the concept of strong reciprocity (Fehr & Gintis, 2007), is a seemingly
16 plausible explanation of cooperation in the final round.

17 This study was able to predict substantive variance in cooperation, however, it does
18 have some limitations. Firstly, the data collection procedure required approximately four hours
19 of participant time, which reduced the potential for a large sample. It also used a fairly
20 homogenous sample in terms of age.

21 This study has implications for enhancing cooperation. By improving sportpersonship,
22 for which Perry, Clough, and Crust (2013) provide some applied recommendations, we can

1 enhance cooperation. Researchers specifically interested in cooperation should strive to
2 examine the role of emotionality more specifically, empathy in competitive conditions.

3 In sum, the condition was only an indicator of cooperation when participants were
4 responding to a change in situation, sportpersonship is a significant predictor of cooperation
5 generally and emotion is a key indicator of cooperation in extremely competitive
6 circumstances.

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1 **Table 1.**
 2 **Bivariate correlations between sportspersonship and trait EI factors**

Variable	Officials	Rules	Injurious Acts	Opponent	Game Perspective	Sportspersonship
<i>Emotional Intelligence</i>						
Wellbeing	-.16 (-.47, .19)	-.26 (-.49, .01)	-.06 (-.36, .26)	-.16 (-.46, .17)	-.20 (-.43, .02)	-.18 (-.47, .13)
Self-control	.17 (-.17, .51)	-.03 (-.37, .30)	.05 (-.29, .39)	.00 (-.39, .42)	.12 (-.21, .43)	.10 (-.27, .46)
Emotionality	.45* (.13, .68) ¹	.39 (.10, .62) ¹	.46* (.12, .77) ¹	.38 (.09, .59) ¹	.59* (.35, .77) ¹	.55* (.25, .77) ¹
Sociability	-.05 (-.38, .24)	-.19 (-.48, .10)	-.24 (-.50, .04)	-.05 (-.37, .28)	-.18 (-.48, .11)	-.16 (-.45, .13)
Global EI	.12 (-.21, .42)	-.08 (-.33, .17)	.05 (-.27, .38)	.06 (-.25, .38)	.06 (-.21, .32)	.07 (-.26, .37)
<i>Emotionality subscale</i>						
Emotion perception	.18 (-.14, .49)	.09 (-.20, .38)	.17 (-.17, .50)	.08 (-.23, .36)	.32* (.01, .63) ¹	.22 (-.15, .54)
Emotion expression	.40* (.11, .63) ¹	.34 (.08, .57) ¹	.31 (.00, .61) ¹	.24 (-.05, .48)	.37* (.14, .56) ¹	.40* (.14, .62) ¹
Trait empathy	.31 (.04, .52) ¹	.29 (-.05, .54)	.38 (.12, .61) ¹	.32 (.04, .56) ¹	.46* (.21, .66) ¹	.42* (.18, .63) ¹
Relationships	.25 (-.01, .50)	.24 (-.08, .52)	.34 (.06, .60) ¹	.33 (.04, .58) ¹	.40* (.07, .65) ¹	.38* (.08, .64) ¹

3 *Statistically significant at $p < .05$. 95% bias-corrected confidence intervals are presented in parentheses

4 ¹Confidence interval does not contain zero.

5

1 **Table 2.**

2 **Pearson correlation coefficients for sportpersonship and cooperation**

Variable	% cooperation	First round cooperation	Final round cooperation	Cooperation after suckered
Officials	.52* (.30, .69) ¹	.33 (.00, .61) ¹	.10 (-.19, .37)	.23 (-.13, .59)
Rules	.25 (-.04, .51)	.14 (-.14, .43)	.12 (-.23, .41)	.00 (-.31, .31)
Injurious acts	.43* (.17, .63) ¹	.16 (-.11, .43)	.21 (-.15, .49)	.03 (-.35, .38)
Opponent	.43* (.17, .62) ¹	.15 (-.21, .45)	.11 (-.30, .49)	-.03 (-.46, .37)
Game perspective	.45* (.16, .68) ¹	.20 (-.11, .57)	.12 (-.33, .50)	.00 (-.38, .45)
Sportpersonship	.51* (.26, .70) ¹	.25 (-.06, .53)	.16 (-.26, .50)	.08 (-.35, .45)
Moral competence	.29 (-.02, .65)	.36 (.10, .62) ¹	.17 (-.09, .47)	.16 (-.12, .49)
Wellbeing	.18 (-.18, .53)	.03 (-.32, .38)	.33 (.03, .57) ¹	.20 (-.13, .51)
Self-control	.20 (-.18, .53)	.21 (-.13, .53)	.34 (-.02, .67)	.23 (-.17, .60)
Emotionality	.60* (.39, .78) ¹	.57* (.35, .75) ¹	.40 (.12, .62) ¹	.32 (.02, .58) ¹
Sociability	-.02 (-.39, .29)	-.01 (-.36, .30)	.24 (-.03, .47)	.27 (-.03, .53)
Global EI	.32 (-.01, .60)	.31 (-.01, .57)	.51* (.18, .72) ¹	.40 (.05, .66) ¹

3 *Statistically significant at $p < q$. 95% bias-corrected confidence intervals are presented in parentheses

4 ¹Confidence interval does not contain zero.

1 **Table 3.**
 2 **Predictors of cooperation**

	B (95% CI)	SE B	β	<i>t</i>	<i>p</i>	<i>R</i> ²
<i>Dependent variable = Cooperation percentage</i>						
<i>Step 1</i>						.01
Condition	-.27 (-17.09, 16.57)	8.33	-.01	-.03	.98	
<i>Step 2</i>						.09
Moral competence	.34 (-.26, .94)	.30	.18	1.16	.26	
Trait EI	17.60 (-5.71, 40.92)	11.52	.24	1.53	.14	
<i>Step 3</i>						.37**
Sportspersonship	26.96 (13.41, 40.50) ¹	6.68	.54	4.03	< .001	
<i>Dependent variable = First round cooperation</i>						
<i>Step 1</i>						.00
Condition	4.05 (-17.19, 25.30)	10.51	.06	.39	.70	
<i>Step 2</i>						.15
Moral competence	.63 (-.10, 1.37)	.36	.27	1.75	.09	
Trait EI	23.84 (-4.79, 52.47)	14.14	.26	1.69	.10	
<i>Step 3</i>						.22
Sportspersonship	17.90 (-1.14, 36.94)	9.40	.28	1.91	.07	
<i>Dependent variable = Final round cooperation</i>						
<i>Step 1</i>						.16**
Condition	-22.07 (-38.34, -5.80) ¹	8.05	-.40	-2.74	< .01	
<i>Step 2</i>						.30**
Moral competence	.22 (-.33, .78)	.27	.11	.83	.42	
Trait EI	34.81 (12.66, 56.96) ¹	10.89	.43	3.20	< .01	
<i>Step 3</i>						.35
Sportspersonship	11.20 (-3.35, 25.75)	7.18	.21	1.56	.13	
<i>Dependent variable = Cooperation after suckered</i>						
<i>Step 1</i>						.04
Condition	-9.92 (-25.72, 5.88)	7.82	-.20	-2.23	.21	
<i>Step 2</i>						.13
Moral competence	.14 (-.42, .70)	.28	.08	.50	.62	
Trait EI	20.41 (-1.48, 42.29)	10.81	.29	1.89	.07	
<i>Step 3</i>						.14
Sportspersonship	3.87 (-11.32, 19.07)	7.50	.08	.52	.61	

3 *Statistically significant ΔR^2 at $p < .05$, ** $p < .01$.

4 ¹Confidence interval does not contain zero.

5