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Who Deals With the Devil? Interdependence, Personality, and Corrupted Collaboration

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Abstract

Corrupted collaboration, that is, gaining personal profits through collaborative immoral acts, is a common and destructive phenomenon in societies. Despite the societal relevance of corrupted collaboration, the role of one's own as well as one's partner's characteristics has hitherto remained unexplained. In the present study, we test these roles using the sequential dyadic die-rolling paradigm ($N = 499$ across five conditions). Our results indicate that interacting with a fully dishonest partner leads to higher cheating rates than interacting with a fully honest partner, although being paired with a fully honest partner does not eliminate dishonesty completely. Furthermore, we found that the basic personality dimension of Honesty–Humility is consistently negatively related to collaborative dishonesty irrespective of whether participants interact with fully honest or fully dishonest partners. Overall, our investigation provides new insights on the role of interaction partner's characteristics in settings allowing for corrupted collaboration.

Keywords

cheating, dishonesty, dyadic die-rolling paradigm, HEXACO, Honesty–Humility

Both cooperation and cheating are ubiquitous in our lives. But while cooperation allows people, organizations, and nations to accomplish goals through working together for mutual benefits, cheating lets them benefit at the expense of others. Given the omnipresence of cooperation and cheating, as well as their crucial impact on individuals and societies at large, research across different fields has investigated both phenomena extensively, suggesting a variety of person and context factors as their antecedents and correlates (e.g., Balliet, Mulder, & Van Lange, 2011; Balliet & Van Lange, 2013; Rosenbaum, Billinger, & Stieglitz, 2014).

Importantly, cooperation and cheating can go hand in hand. Consider, for example, bribery. Therein, people need to align dishonest acts for mutual benefits (e.g., one person needs to give a bribe and another one needs to take a bribe). But not until very recently have cooperation and cheating been aligned with each other experimentally. Specifically, Weisel and Shalvi (2015) investigated corrupted collaboration, defined as "the attainment of personal profits by joint immoral acts" (p. 10651), employing the newly introduced sequential dyadic die-rolling paradigm. This paradigm is an extension and adaptation of the widely used die-rolling paradigm (Fischbacher & Föllmi-Heusi, 2013), tailored to study the effects when cooperation and cheating are fully intertwined and, thus, when two moral principles—honesty and cooperation—are at odds with each other.[1]

In the sequential dyadic die-rolling paradigm (Weisel & Shalvi, 2015), two people, Player A and Player B, work together in a cheating task providing the chance for personal profit. Specifically, first A rolls a die in secret and reports the number she or he obtained and then B—knowing about A's reported number—rolls a die in secret and reports the number she or he obtained. In the "aligned outcomes" condition of this paradigm, the players' profits are determined by two aspects: (i) players only gain profit if both players report the same number and (ii) the higher the reported number, the more profit the players gain. Thus, individual cheating acts by A (reporting a high number to increase potential profit) and B (reporting the same number as A to gain profit at all) work together for the highest mutual benefit, reflecting corrupted collaboration.

Weisel and Shalvi (2015) compared people's behavior in the aligned outcomes condition over 20 trials with people's behavior in a condition in which cheating did not require collaboration with others and with a condition in which cheating benefited only the other player. In the aligned outcomes

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condition, "the proportion of reported doubles was 489% higher than the expected proportion assuming honesty, 48% higher than when individuals rolled and reported alone, and 96% higher than when lies only benefited the other player" (p. 10651). This general importance of corrupted collaboration has not only been replicated by the same research group (Soraperra et al., 2017) but also, though with smaller effect sizes, in recent preregistered studies by others (Wouda, Bijlstra, Frankenhuis, & Wigboldus, 2017).

But while scientific evidence for the occurrence of corrupted collaboration is clearly a cornerstone itself, two important aspects in this regard have been largely neglected, namely, the influence of one's partner's behavior and one's own personality traits. Exploring these is the focus of the present investigation.

Specifically, concerning the role of one's partner's behavior, any form of collaboration undoubtedly involves a large degree of interdependence between the interaction partners, meaning that the outcomes for one interaction partner are influenced by the behavior of the other interaction partner (Reis, 2008). In line with interdependence theory, situations containing interdependence are, among other things, influenced by the personality characteristics of the interaction partners (e.g., Kelley et al., 2003). That is, in interactions containing a certain level of interdependence, one interaction partner influences the results of the interaction not only through her or his behavior directly but also through influencing the behavior of the interaction partner (Rusbult & Van Lange, 2008). Corresponding to this theorizing, Weisel and Shalvi (2015) found that in the aligned outcomes condition, 100% of Players B were brazen (i.e., reporting matching numbers) when they observed that Players A were brazen (i.e., reporting only the highest number), while only 33.33% of Bs were brazen when As were not brazen. Importantly, however, these observations were based on a very small number (5) of purely brazen dyads and, more generally, Weisel and Shalvi (2015) just observed such differences but did not test for them experimentally. Consequently, the first aim of our study is to investigate systematically how the behavior of one interaction partner affects the behavior of the other interaction partner in situations of corrupted collaboration. In general, we hypothesize that interacting with a fully dishonest (brazen) partner results in more cheating than interacting with an honest partner (Hypothesis 1) and, thus, that the behavior of one's partner has an impact on one's own behavior.[2]

The second aim of the study is to investigate the importance of people's own personality for corrupted collaboration. One obvious candidate in this regard is the Honesty–Humility dimension from the HEXACO Model of Personality (Ashton & Lee, 2007). The HEXACO model comprises six personality dimensions, **H**onesty-Humility, **E**motionality, e**X**traversion, **A**greeableness, **C**onscientiousness, and **O**penness to experience. Honesty–Humility comprises such characteristics as being honest, modest, and sincere versus deceitful, pretentious, and sly (Ashton & Lee, 2008). Correspondingly, Honesty–Humility has been found to be linked negatively to cheating (Hilbig & Zettler, 2015; Kleinlogel, Dietz, & Antonakis, 2018) and to different forms of unethical behavior (for an overview, see Liu, Zettler, & Hilbig, 2017). Thus, in line with repeated calls for linking personality dimensions to observations of actual behavior (Baumeister, Vohs, & Funder, 2007), we expect that individual differences in Honesty–Humility will predict how people behave in situations allowing for corrupted collaboration. Specifically, we hypothesize that people who are lower in Honesty–Humility cheat more than those who are higher in Honesty–Humility (Hypothesis 2).

Method

Procedure and Participants

The first aim of the study was to investigate how the behavior of one's interaction partner affects one's own behavior, in settings of corrupted collaboration. In order to provide a strict test paradigm in this regard, we experimentally manipulated the behavior of one's interaction partner in the aligned outcomes condition of the sequential dyadic die-rolling task (see below). Specifically, we conducted an online study in which each participant took part in 20 trials (as in Weisel & Shalvi, 2015) of this task. Importantly, each participant did not play with another real participant (whose behavior we could not have manipulated experimentally) but was randomly paired with one (out of five) computer algorithms that resembled either a completely honest or a completely brazen (dishonest) interaction partner. It should be noted that the computer algorithms resembled patterns of behavior actually observed in the study by Weisel and Shalvi (2015) and, thus, were not implausible.

More precisely, we set up an online study using the framework formr (www.formr.org; Arslan & Tata, 2017), recruiting a sample via the survey panel Amazon Mechanical Turk (www.mturk.com; Buhrmester, Kwang, & Gosling, 2011). Effectively, we collected data from 580 participants from which we excluded 81 people who failed an attention check item interspersed in the personality questionnaire ($N = 9$) and/or who failed the control question assessing whether participants understood the instruction of the dyadic die-rolling task ($N = 72$). Thus, the final sample consisted of 499 participants (223 females, 275 males, and 1 person who indicated gender as "other"), aged 20–75 years ($M = 36.48$, $SD = 10.63$).

Participants were offered US$3.20 as flat fee for participating in the study, which took 20 min on average. Furthermore, as described in more detail below, participants had the chance to win an additional payoff based on one randomly chosen outcome in the sequential dyadic die-rolling task (participants won an additional US$1.05, on average). When entering the study, participants—in this order—(i) received basic information about the study, (ii) gave consent to participate, (iii) provided some demographic information, and (iv) completed a questionnaire assessing their basic personality traits, including Honesty–Humility. Then, participants were informed about the rules of the sequential dyadic die-rolling task (in the aligned outcomes condition) and the corresponding incentive structure. At this juncture, we provided an interactive table through

Table 1. Overview of the Conditions.

	Condition				
	A-Honest	A-Brazen	B-Honest	B-Brazen Matching	B-Brazen Signaling
In each trial					
1. Algorithm is player	A	A	B	B	B
2. Participant is player	B	B	A	A	A
3. Algorithm reports	Random number between 1 and 6	Always 6	Random number between 1 and 6	Number matching the participant's number	Always 6

which participants could experience the various potential outcomes in the sequential dyadic die-rolling task. Additionally, participants were informed that they would be randomly matched with another player, with whom they would interact in 20 trials of the sequential dyadic die-rolling task, and that their final payment would be based on the flat fee plus the outcome of one randomly chosen trial (of 20). In order to check whether participants understood the instructions, we added a control question asking about the outcome of one fictitious trial in the sequential dyadic die-rolling task. Then, they completed the sequential dyadic die-rolling task (in one of five conditions, see below and in Table 1), received information about their additional payoff, and were finally thanked for their participation and debriefed. In the debriefing, participants were offered the option of withdrawing their data from our data set (without losing their payment) by simply sending an e-mail to the study administration because the study involved deception (participants were (mis)informed that they were paired with another participant, while they were playing with a computer algorithm). No participant chose this offer. Also, it is to be noted that we had received ethical approval for our study prior to collecting data from our institutional review board.

Measures

HEXACO-60

We assessed participants' basic personality traits in line with the HEXACO Model of Personality (Ashton & Lee, 2007) via the HEXACO-60 (Ashton & Lee, 2009), which assesses each of the 6 HEXACO traits via 10 items per trait. We opted for administering the entire HEXACO-60 (and not only the items assessing Honesty–Humility) in order to (i) avoid bringing the content of Honesty–Humility into the focus of attention and (ii) investigate the relations between the other basic personality traits and cheating (in a corrupted collaboration setting) from an exploratory point of view.

In the HEXACO-60, participants are asked to rate the extent to which they agree with statements about themselves or people in general on a 5-point Likert-type scale (ranging from 1 = *strongly disagree* to 5 = *strongly agree*). Sample items for Honesty–Humility are "I would never accept a bribe, even if it were very large" or "Having a lot of money is not especially important to me." In order to control for inattentive responding (e.g., Bowling et al., 2016), we interspersed an attention check item in the

Table 2. Means, Standard Deviations, and Cronbach's α of the HEXACO-60 Factors.

	M (*SD*)	α
Honesty–Humility	3.50 (.79)	.79
Emotionality	3.02 (.80)	.83
Extraversion	3.19 (.87)	.88
Agreeableness	3.35 (.76)	.84
Conscientiousness	3.88 (.66)	.81
Openness to experience	3.64 (.82)	.84

Note. M = mean; *SD* = standard deviation.

HEXACO-60 in which participants were asked to choose a certain response category. In our study, the HEXACO-60 factors yielded good internal consistency estimates (see Table 2 for means, standard deviations, and Cronbach's α values). More information about the HEXACO model in general and the HEXACO-60 can be found at www.hexaco.org.

Sequential Dyadic Die-Rolling Task

As outlined above, the sequential dyadic die-rolling task involves two players: Player A first rolls a die in secret and reports the outcome and then Player B, knowing Player's A reported outcome, rolls a die in secret and reports the outcome (Soraperra et al., 2017; Weisel & Shalvi, 2015; Wouda et al., 2017). Importantly, in the aligned outcome condition used herein, both players gain additional payoff (in addition to their flat fee) if both players report the same number; thus, Player B has an incentive to report the same number as Player A. Furthermore, if both players report the same number, the size of the payoff is determined by the reported number; thus, Player A has an incentive to report a high number.

In our study, the additional payoff could range between US$0 (if different numbers were reported in a trial) and US$3 (if both reported a six in a trial). The additional payoff for reporting the same number increased in US$0.50 steps from reporting a one (US$0.50) to reporting a six (US$3). Obviously, participants could easily report a false number (or even not roll a die at all). Cheating rates are calculated by comparing the distribution of reported numbers with the distribution assuming full honesty.

Instead of playing with an actual other person, participants were in fact assigned randomly to one of the five conditions.

Specifically, in three conditions, they participated as Player A (in all trials), and in two conditions, they participated as Player B (in all trials) in the sequential dyadic die-rolling task. In all conditions, the computer algorithm constantly mimicked the behavior of either an honest or a brazen/dishonest player. In order to create the experience of being matched with an actual player (and not a computer algorithm), we added a random time period of between 10 and 30 s before participants were allocated to a condition and, in turn, informed about that they were paired with another player and randomly chosen to be either Player A or Player B. Furthermore, in each trial, participants had to wait for a random time period between 5 and 15 s before they were informed about the other player's (i.e., the algorithm's) reported number.

After each trial, participants were informed about what the additional payoff would be if this trial was randomly selected to determine the final payoff. After all 20 trials, participants were shown a table with the reported numbers and outcomes of each trial. Then, one trial was chosen randomly, and the result—including information about whether the participants got an additional payoff or not—was shown to them (before the debriefing).

The five conditions are shown in Table 1. If the computer algorithm mimicked the behavior of Player A, it reported either a random number between 1 and 6 (condition: A-honest, because this behavior resembles a fully honest Player A) or always a 6 (condition: A-brazen, because this behavior resembles a fully brazen Player A). If the computer algorithm mimicked the behavior of Player B, it reported either a random number between 1 and 6 (condition: B-honest, because this behavior resembles a fully honest Player B) or always the number matching the number reported by the participant (condition: B-brazen matching, because this behavior mimics a brazen Player B who always wants to gain the additional payoff) or always reported a 6 (condition: B-brazen signaling, because this behavior mimics a brazen Player B who signals to the interaction partner to aim for the highest outcome possible). Study materials are available at the Open Science Framework (https://osf.io/t7r3h/)

Results

In the following, we used two different logistic regression models to analyze cheating rates across A-conditions and across B-conditions, respectively. Whereas cheating in the two A-conditions is reflected by reporting exactly the number matching that of Player A, cheating in the three B-conditions is reflected by generally reporting higher numbers. Hence, for the two A-conditions, we used hierarchical logistic regression with a binary outcome variable (match or no match), while for the three B-conditions, we use ordinal hierarchical logistic regression with six levels of the ordered outcome variable (corresponding to the six outcomes of a die-roll, where higher numbers may result in higher payoffs).

Furthermore, we used a conceptually similar type of analysis for testing whether cheating was present at all in each of the five conditions. Namely, for the A-conditions, we used a likelihood ratio test (LRT) to calculate the G^2 statistic, which tests whether the number of reported matches across 18 trials deviates from a binomial distribution with $p = 1/6$, which is the distribution one would obtain when assuming full honesty of the participants. For the B-conditions, we also used an LRT to test whether the frequency of reported numbers across 18 trials differs from a multinomial distribution with $p = 1/6$ for each outcome, which again corresponds to the distribution assuming full honesty. Note that the rationale for using the abovementioned analysis is included in the Supplemental Material (pp. 2-3).

Cheating Rates Across A-Conditions

We excluded the first two trials from the analyses reported below because people needed to learn about the other's (i.e., the computer algorithm's) behavior. Furthermore, since the number of trials is relatively small, we used bootstrapping (10,000 samples) to obtain valid p values for the small number of observations per person. We found that the probability of reporting a matching outcome across 18 trials was significantly higher than expected based on the probability distribution assuming full honesty (a binomial distribution with $p = 1/6$) in both the A-honest condition, $G^2(93) = 1287.99$, $p < .001$ one-sided, and the A-brazen condition, $G^2(105) = 3155.23$, $p < .001$ one-sided. Therefore, participants cheated in both A-conditions. The odds ratios of reporting a match relative to the baseline probability of $p = 1/6$ were $OR = 2.74$ (95% confidence interval [CI] = [1.96, 3.84]) and $OR = 16.08$ (95% CI [8.72, 33.85]) for the A-honest and A-brazen conditions, respectively (for illustration, see Figure 1). This means that in comparison to the distribution assuming full honesty, the odds of reporting a match were 2.74 times higher in the A-honest condition and 16.08 times higher in the A-brazen condition. Odds ratios and confidence intervals were estimated using a shifted intercept parameter in a hierarchical logistic regression model with a fixed offset term for the baseline probability $p = 1/6$.

Differences in Cheating Between the Two A-Conditions

In line with our hypothesis, we found that participants in the A-conditions were more likely to report a matching outcome across 18 trials when they were paired with a brazen/dishonest partner than when they were paired with an honest partner ($\beta = 1.51$, $OR = 4.51$, 95% CI [2.31, 8.82], $z = 4.40$, $p < .001$ one-sided). This result implies that the odds of reporting a matching outcome in the A-brazen condition were 4.51 times higher than in the A-honest condition.

Personality and Cheating Across A-Conditions

With respect to personality, we found that while controlling for differences in cheating rates across conditions, Honesty–Humility negatively predicted the probability of reporting matching outcomes across 18 trials ($\beta = -0.45$, $OR = 0.64$, 95% CI

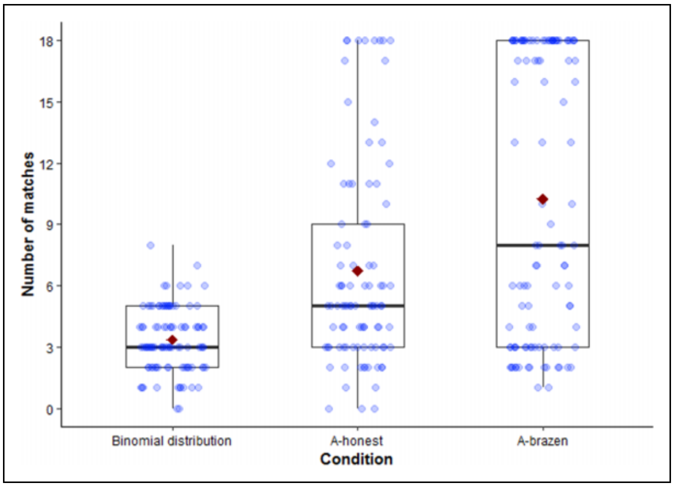

Figure 1. The blue circles indicate the number of reported matches across 18 trials: assuming full honesty (binomial distribution with $p = 1/6$), in the A-honest condition and in the A-brazen condition. Binomial distribution refers to a generated distribution of the number of reported matches assuming full honesty. Thick horizontal lines represent medians, red diamonds represent means, boxes indicate interquartile range, and vertical lines range from the lowest value to the highest.

[0.46, 0.88], $z = -2.74$ $p = .003$ one-sided). Figure 2 shows that the estimated probability of reporting a matching outcome decreased for persons higher in Honesty–Humility and was generally higher in the A-brazen than in the A-honest condition, while on average being above the baseline level of $p = 1/6$ assuming completely honest responding.

From an exploratory perspective, we tested the associations between the other HEXACO personality traits and cheating. We found that Emotionality (β = –0.33, *OR* = 0.72, 95% CI [0.53, 0.99], $z = -2.05$, $p = .040$) negatively predicted the probability of reporting a matching outcome, while Extraversion (β = 0.61, *OR* = 1.84, 95% CI [1.31, 2.59], $z = 3.50$, $p < .001$) was positively related to the probability of reporting a match across 18 trials. In sum, this means that for an increase of one standard deviation (*SD*) in Honesty–Humility and an increase of one *SD* in Emotionality, the odds of reporting a match were 0.64 and 0.72 times lower, respectively, while for an increase of one *SD* in Extraversion, the odds of reporting a match were 1.84 times higher. However, in a regression model including all six HEXACO traits jointly, only the effects of Honesty–Humility (β = −0.69, *OR* = 0.50, 95% CI [0.35, 0.73], $z = -3.64$, $p < .001$) and Extraversion (β = 0.52, *OR* = 1.68, 95% CI [1.15, 2.46], $z = 2.66$, $p = .008$) remained significant. In this model, the odds of reporting a matching outcome were 0.50 times lower and 1.68 times higher for an increase of one *SD* in Honesty–Humility and one *SD* in Extraversion, respectively. Table 3 shows both the first-order effects and the estimates for the model with all six HEXACO traits. The results when fitting separate models for each condition can be found in the Supplemental Material Table S1

Cheating Rates Across B-Conditions

Analogously to the A-conditions, we excluded the first two trials from the following analyses and used bootstrapping (10,000 samples) to test whether the observed frequencies of reported numbers differed from the probability $p = 1/6$ assuming full honesty. We found that in the B-honest, ($G^2(485) = 2089.90$, $p < .001$ one-sided, the B-brazen matching, $G^2(535)$

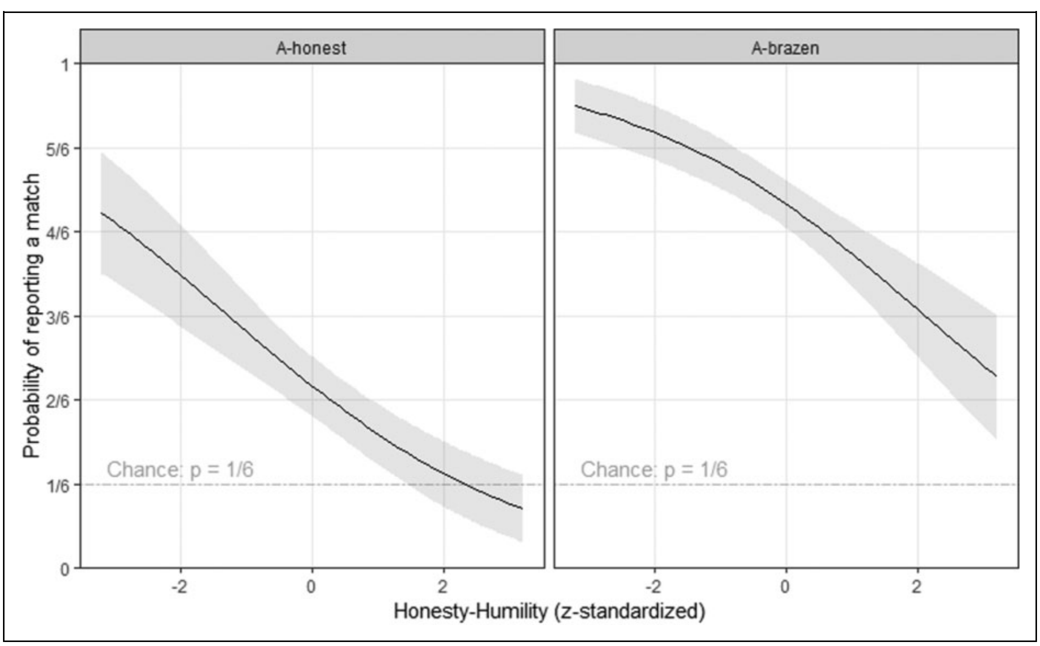

Figure 2. Probability of reporting a matching outcome in the two A-conditions as estimated in a hierarchical logistic regression with Honesty–Humility and condition as predictors and a random intercept for participants. The dotted horizontal line represents the probability of reporting a matching outcome assuming full honesty ($p = 1/6$). The error bands show bootstrapped standard errors.

Table 3. Odds Ratios of Reporting a Matching Outcome in the A-Conditions Across 18 Trials With Associated Confidence Intervals.

	First-Order Effects of HEXACO Traits					Model With All Six HEXACO Traits				
	β	*SE*	*p*	*OR*	95% CI	β	*SE*	*p*	*OR*	95% CI
H	−.45	.16	**.003**	0.64	[0.46, 0.88]	−.69	.19	**<.001**	0.50	[0.35, 0.73]
E	−.33	.16	**.040**	0.72	[0.53, 0.99]	−.15	.16	.349	0.86	[0.63, 1.18]
X	.61	.17	**<.001**	1.84	[1.31, 2.59]	.52	.19	**.008**	1.68	[1.15, 2.46]
A	.22	.17	.200	1.24	[0.89, 1.73]	.27	.18	.140	1.31	[0.92, 1.87]
C	.12	.18	.499	1.13	[0.79, 1.62]	.17	.20	.399	1.19	[0.80, 1.77]
O	.12	.16	.483	1.22	[0.81, 1.55]	.05	.16	.732	1.06	[0.77, 1.44]

Note. All models included condition as a discrete predictor. The *p* values for first-order effects of Honesty–Humility are one-sided. H = Honesty–Humility; E = Emotionality; X = eXtraversion; A = Agreeableness, C = Conscientiousness, O = Openness to experience. Boldface values are statistically significant at $p < .05$.

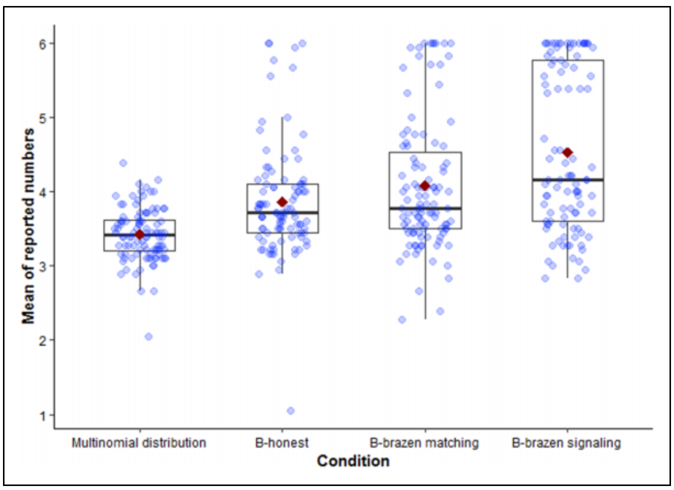

Figure 3. The blue circles indicate the means of reported numbers across 18 trials: assuming full honesty (multinomial distribution), in the B-honest, the B-brazen matching, and the B-brazen signaling conditions. Multinomial distribution refers to a generated distribution of the mean of reported numbers assuming full honesty. Horizontal lines represent medians, red diamonds represent means, boxes indicate interquartile range, and vertical lines range from the lowest to the highest value.

= 2516.72, $p < .001$ one-sided, and the B-brazen signaling ($G^2(485) = 3180.84$, $p < .001$ one-sided) conditions participants reported significantly more higher numbers than expected based on the multinomial distribution (with $p = 1/6$ for each number in 18 trials). Hence, participants cheated in each of the three B-conditions. The corresponding effect sizes for comparing the mean of the reported numbers per person with the expected mean of 3.5 when assuming full honesty (Cohen's *d* with 95% CI) were $d = .49$ [0.29, 0.69] for B-honest, $d = .64$ [0.45, 0.84] for B-brazen matching, and $d = .95$ [0.75, 1.15] for B-brazen signaling (for illustration, see Figure 3).

Differences in Cheating Between the Three B-Conditions

In order to compare the B-conditions to each other, we ran a contrast analysis with the B-honest condition as a reference category. We found that in comparison to the B-honest condition, the probability of reporting a higher number was larger in the B-brazen signaling condition (β = 1.27, $OR = 3.57$, 95% CI [2.29, 5.59], $z = 5.58$, $p < .001$ one-sided) but not in the B-brazen matching condition (β = 0.34, $OR = 1.41$, 95% CI [0.92, 2.16], $z = 1.57$, $p = .06$ one-sided). This corresponds to odds of reporting a higher number that were 3.57 times larger in the B-brazen signaling condition than in the B-honest condition. In a follow-up test including only the data from the two B-brazen conditions, the difference between the B-brazen signaling and the B-brazen matching condition was significant (β = 0.96, $OR = 2.61$, 95% CI [1.58, 4.30], $z = 3.76$, $p < .001$), showing that the odds of reporting a higher number were 2.61 times larger in the B-brazen signaling condition than in the B-brazen matching condition (note, however, that this additional test is not independent of the first two tests).

Personality and Cheating Across B-Conditions

With respect to personality traits, we found that while controlling for differences between conditions, there was a negative relation between Honesty–Humility and the probability of reporting a higher number (β = −0.27, $OR = 0.76$, 95% CI [0.64, 0.91], $z = -3.07$, $p = .001$ one-sided), which means that the odds of reporting a higher number were 0.76 times lower for an increase of one *SD* in Honesty–Humility. Figure 4 illustrates this effect: For persons higher in Honesty–Humility, the estimated probability of reporting the number 6 decreased, whereas the probability of reporting any of the lower numbers between 1 and 5 increased toward the baseline probability of $p = 1/6$ assuming honest responding. Moreover, Figure 4 shows that the probability of reporting the highest number 6 was on average higher in the B-brazen signaling condition than in the B-honest condition (see previous section).

From an exploratory perspective, we found a positive relation between Extraversion and the probability of reporting a higher number (β = 0.21, $OR = 1.24$, 95% CI [1.05, 1.46], $z = 2.52$, $p = .012$), which suggests that for an increase of one *SD* in Extraversion, the odds of reporting a higher number were 1.24 times larger. In a model including all six HEXACO traits, Honesty–Humility (β = −0.28, $OR = 0.76$, 95% CI [0.63, 0.91], $z = -2.95$, $p = .003$) and Extraversion (β = 0.22, $OR = 1.24$, 95% CI [1.03, 1.50], $z = 2.25$, $p = .02$) remained as the only significant predictors of the probability of reporting a

Figure 4. Predicted probability of reporting each of the six possible outcomes of the die roll (1–6) in the three B-conditions as estimated in a hierarchical ordinal logistic regression with Honesty–Humility and condition as predictors and a random intercept for participants. Each line indicates a different outcome of a die roll. The horizontal dotted line shows the probability of reporting each number assuming full honesty ($p = 1/6$). The error bands show bootstrapped standard errors.

Table 4. Odds Ratios of Reporting Higher Number in the Three B-Conditions Across 18 Trials With Associated Confidence Intervals.

	First-Order Effects of HEXACO Traits					Model With All Six HEXACO Traits				
	β	*SE*	*p*	*OR*	95% CI	β	*SE*	*p*	*OR*	95% CI
H	−.27	.09	**.001**	0.76	[0.64, 0.91]	−.28	.09	**.003**	0.76	[0.63, 0.91]
E	−.16	.09	.071	0.85	[0.71, 1.01]	−.13	.09	.163	0.88	[0.74, 1.05]
X	.21	.08	**.012**	1.24	[1.05, 1.46]	.22	.10	**.024**	1.24	[1.03, 1.50]
A	.03	.09	.710	1.03	[0.87, 1.23]	.02	.09	.861	1.02	[0.85, 1.22]
C	−.01	.09	.880	0.99	[0.83, 1.18]	−.00	.10	.983	1.00	[0.83, 1.21]
O	−.06	.09	.520	0.94	[0.79, 1.13]	−.11	.09	.241	0.90	[0.75, 1.08]

Note. All models included two dummy-coded variables for the two B-brazen conditions, with the reference category for the B-honest condition. The *p* values for first-order effects of Honesty–Humility are one-sided. H = Honesty–Humility; E = Emotionality; X = eXtraversion; A = Agreeableness; C = Conscientiousness; O = Openness to experience. Boldface values are statistically significant at $p < .05$.

higher number. For the relations between other HEXACO factors and dishonesty, see Table 4.

Discussion

Collaborating with other people is an integral part of everyday life. Although cooperation is commonly perceived as a positive phenomenon, recent studies indicate that it can also result in more unethical behavior (Weisel & Shalvi, 2015). In the present study, we not only replicated previous findings showing that collaborative settings can be related to dishonest behavior but also we tested experimentally and found, for the first time, that corrupted collaboration occurs more frequently when people are interacting with a dishonest (brazen) partner than when they are interacting with an honest one. Furthermore, we found that although being paired with a fully honest partner reduces cheating, it does not eliminate it completely.

Additionally, we found that high levels of Honesty–Humility serve as a consistent buffer, reducing cheating in collaborative settings. Importantly, Honesty–Humility was negatively related to corrupted collaboration irrespective of whether participants were faced with an honest or a brazen behavior-mimicking algorithm. Although there is substantial empirical evidence that in individual contexts, people who are high in Honesty–Humility cheat less than people low in Honesty–Humility (Heck, Thielmann, Moshagen, & Hilbig, 2018; Hilbig & Zettler, 2015), no study hitherto has tested whether people high in this dimension also cheat less in a corrupted collaboration setting. As Honesty–Humility has been linked to both collaborative (e.g., Zettler, Hilbig, & Heydasch, 2013) and honest behaviors, the relation between Honesty–Humility and collaborative dishonesty (which by definition requires both collaboration and dishonesty) was previously unknown, and thus, our study addresses this gap in research.

Next to Honesty–Humility, we found inconsistent support for a negative link of Emotionality to cheating and more robust evidence for a positive link of Extraversion to cheating. For both of these personality dimensions, previous research has provided mixed evidence on whether or not those traits are connected to dishonesty (e.g., Gylfason, Halldorsson, & Kristinsson, 2016; Hilbig & Zettler, 2015; Kleinlogel et al., 2018), with a recent large-scale reanalysis pointing toward a null effect of Emotionality (Heck et al., 2018). Therefore, future studies should determine in which settings one can observe associations between Emotionality and Extraversion and dishonest behavior.

While we set up our research question through the lens of interdependence theory (Kelley et al., 2003), the influence of brazen and honest partners on cheating behavior might also be regarded as priming effects (with the behavior of one partner priming the behavior of the other partner; Kleinlogel et al., 2018; Mazar, Amir, & Ariely, 2008). Regarding this issue, a recent study by Kleinlogel et al. (2018) found that individuals high in Honesty–Humility avoided cheating both in a moral priming condition, namely, when participants were primed with morality-related book titles, and in an immoral priming condition, namely, when primed with immorality-related book titles. On the other hand, participants low in Honesty–Humility were more likely to cheat in an immoral priming condition, when compared to moral and neutral priming conditions. In the present study, we found a negative relation between Honesty–Humility and dishonesty independently of whether participants were paired with an honest or a dishonest partner, so in conditions that could be interpreted as both moral and immoral priming (for a statistical test of the interaction of Honesty–Humility and condition, see Supplemental Material Table S3). Thus, future studies should disentangle the role of Honesty–Humility in dishonest behavior in relation to priming and interdependence effects.

One limitation of our study might be the reliance on an Amazon Mechanical Turk sample because Amazon Mechanical Turk has been used repeatedly for studies on cheating (e.g., Peer, Acquisti, & Shalvi, 2014; Schindler & Pfattheicher, 2017). Furthermore, although our study included several conditions, future studies could aim to replicate our findings across multiple experiments. Another future extension might be to compare the impact of cooperation with honest and brazen players on dishonesty to the influence of mere exposure to honest and brazen behavior on cheating behavior. In a recent study, Soraperra et al. (2017) found that although in the aligned outcomes condition, there were fewer honest dyads than in the normal exposure condition (where participants observed behavior of another player, but their outcomes were not aligned with each other), the average dishonesty was similar in the two conditions. Hence, future studies could investigate the difference between actual cooperation with fully brazen or honest partners and only being exposed to fully honest and dishonest behavior. Additionally, future studies might focus on testing collaborative corruption in conditions in which it is emphasized that cheating has negative consequences for a third party.

As both collaboration and dishonesty are ubiquitous in our everyday life, knowledge about factors mitigating corrupted collaboration is of a crucial importance. Our study brings about some novel insights in this regard by showing that the behavior of one of the interaction partners affects the behavior of another with respect to collaborative dishonesty and by showing that people's basic personality is linked to cheating in collaborative settings. Since, according to our results, outcomes of situations involving collaboration and allowing the interaction partners to cheat (e.g., bribery) can depend on strong (e.g., extremely brazen, extremely honest) behavior of one interaction partner, our study bears relevant implications for everyday life. When people are dealing with the devil, some may be more dishonest, and some may resist temptations. Some people, however, may even cheat when dealing with an angel.

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Supplemental Material

The supplemental material is available in the online version of the article.

Notes

1. Note that one stream of research has investigated the effects when individual acts of cheating benefit oneself and/or others (e.g., Conrads, Irlenbusch, Rilke, & Walkowitz, 2011). In these studies, however, people do not need to show aligned acts of cheating (indeed, such studies typically provide an opportunity to cheat to one person only). Cooperation is thus reflected by mutual benefits in such studies, but not by intertwined acts of two or more people to gain the benefits.
2. The exact hypotheses were preregistered and can be found at https://osf.io/grejx/

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