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It takes two: Honesty–Humility and Agreeableness differentially predict active versus reactive cooperation

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ABSTRACT

Recently, similar six-factor solutions have emerged in lexical studies across languages, giving rise to the HEXACO model of personality. As a core extension of its most well-known predecessor, the five-factor model, the HEXACO model distinguishes between two factors predicting complimentary aspects of prosocial behavior or, more specifically, reciprocal altruism: Honesty–Humility (the tendency toward active cooperation, i.e. non-exploitation) and Agreeableness (the tendency toward reactive cooperation, i.e. non-retaliation). However, this dissociation has not yet been tested to its full extent. To this end, we herein present re-analyses of published studies ($N = 1090$), showing that Honesty–Humility, but not Agreeableness, indeed predicts active cooperation. More importantly, in a new experiment ($N = 410$), we found a pattern of two concurrent selective associations, supporting the theoretical distinction between the two factors: Honesty–Humility (but not Agreeableness) predicted active cooperation (non-exploitation in the dictator game), whereas Agreeableness (but not Honesty–Humility) was linked to reactive cooperation (non-retaliation in the ultimatum game).

1. Introduction

In the past two to three decades, there has been an upsurge of interest in models of basic personality, that is, theories specifying – as completely and yet parsimoniously as possible – the basic dimensions of individual differences. Since the late 1980s, most research has focused on the five-factor-model (McCrae & Costa, 1989, 1999), but more recent lexical studies across different languages have implied a common six-factor structure (Ashton et al., 2004; Lee & Ashton, 2008). The corresponding HEXACO model of personality (an acronym for the six factors Honesty–Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience) can be described as a variation and extension of the earlier five-factor model. Whereas the factors Extraversion, Conscientiousness, and Openness are practically identical across the two models, the HEXACO model differs from its predecessor in how different aspects of prosocial behavior are distributed across factors.

In the five-factor model, prosocial behavior is mainly a question of Agreeableness (and, partially, Neuroticism) – the HEXACO model, by contrast, distinguishes between a newly proposed Honesty–Humility factor, Agreeableness, and Emotionality (which is similar though not equivalent to Neuroticism) as determinants of prosocial behavior (Ashton & Lee, 2001). Whereas Emotionality covers aspects such as empathy and attachment (thus relating to kin altruism), Honesty–Humility and Agreeableness represent complementary aspects of reciprocal altruism (Ashton & Lee, 2007). More specifically, Honesty–Humility covers what we will herein call *active cooperation*, that is, "the tendency to be fair and genuine in dealing with others, in the sense of cooperating with others even when one might exploit them without suffering retaliation" (Ashton & Lee, 2007, p. 156). Agreeableness, on the other hand, stands for *reactive cooperation*, that is, "the tendency to be forgiving and tolerant of others, in the sense of cooperating with others even when one might be suffering exploitation by them" (Ashton & Lee, 2007, p. 156). Although it is plausible that active and reactive cooperativeness will be linked to some extent, they need not be equivalent (see also Hilbig, Zettler, Moshagen, & Heydasch, in press). In turn, Honesty–Humility and Agreeableness may well represent different aspects of individual differences in cooperation which should be kept apart.

As a first indication, the emergence of a six-factor structure in lexical studies per se and, correspondingly, small to intermediate correlations between Honesty–Humility and Agreeableness (e.g., Ashton, Lee, Marcus, & De Vries, 2007; Lee & Ashton, 2004, 2008; Moshagen, Hilbig, & Zettler, submitted for publication; Zettler,

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Table 1
Results from re-analyses of five datasets comprising self-reports on Honesty-Humility and Agreeableness along with different measures of active cooperation.

Publication	*N*	Criterion variable	Bivariate correlation coefficients (Bayesian posterior probability of the correlation hypothesis)		Difference in correlation coefficients	Beta-weights from multiple linear regression	
			HH	AG		HH	AG
Hilbig and Zettler (2009)	134	Dictator giving[a]	.27** (.93)	.10 (.14)	$Z = 1.7^{*}$	.26**	.02
Hilbig and Zettler (2009)	134	Social values[b]	.25** (.87)	.11 (.16)	$Z = 1.4^{*}$	.24**	.03
Hilbig et al. (in press, Study 2)	531	Social values[b]	.17*** (.99)	.07* (.15)	$Z = 1.8^{*}$	.16***	.04
Hilbig et al. (2012, Study 1)	70	Public goods[c]	.33** (.87)	.03 (.11)	$Z = 2.0^{*}$	.34**	−.05
Hilbig et al. (2012, Study 2)	355	Public goods[c]	.25*** (>.99)	.11* (.30)	$Z = 2.2^{*}$	.23***	.04

N = sample size.
* $p < .05$ (all one-sided).
** $p < .01$(all one-sided).
*** $p < .001$ (all one-sided).
[a] Proportion of endowment allocated to the recipient in a hypothetical dictator game.
[b] Proportion of prosocial choices (out of 9 three-alternative forced-choice decisions) in the triple-dominance or decomposed games task.
[c] Proportion of the endowment contributed to the public good in a hypothetical, one-shot, anonymous, 5-person public goods game.

Friedrich, & Hilbig, 2011) can be considered a necessary condition for keeping the two factors apart theoretically. However, this type of observation is not sufficient. Rather, following the logic that double dissociations are indicative of specificity (Teuber, 1955), a particularly strong case for the theoretical separation between Honesty–Humility and Agreeableness as implied by the HEXACO model of personality could be made by showing that Honesty–Humility *selectively* (that is, Honesty–Humility but not Agreeableness) predicts active cooperation, whereas Agreeableness *selectively* predicts reactive cooperation. Without such a critical test of concurrent selective associations, it remains an open question whether the implications of the HEXACO model (in terms of the distinction between Honesty–Humility vs. Agreeableness) are appropriate. Aiming to clarify this issue, we will briefly review extant literature and report both re-analyses of published data sets and a new experiment in what follows.

1.1. Previous findings

In line with what would be expected from the HEXACO model, Shepherd and Belicki (2008) found stronger associations between Agreeableness and diverse measures of forgiveness than between Honesty–Humility and the latter. However, Honesty–Humility was also a noteworthy predictor, thus suggesting that both factors play a role for reactive cooperation. Similar results were reported by Perugini, Gallucci, Presaghi, and Ercolani (2003) who found that both Honesty–Humility and Agreeableness predicted the readiness to retaliate, but Agreeableness more strongly so.[1] Though these results do not constitute full dissociations, they do hint that differences between the two factors exist.

However, other studies have reported less supportive evidence. Sheppard and Boon (2012), for example, found that Honesty–Humility and Agreeableness showed similar associations ($r \sim .40$) with vengeance – though there were some differences between the factors in terms of how participants weighed the costs and benefits of vengeance. Concerning both vengefulness and the tendency towards calculated reactions to transgressions, Lee and Ashton (2012) also reported correlations of similar magnitude with Honesty–Humility and Agreeableness in self-reports. In peer-reports, Honesty–Humility even appeared to be more strongly linked to vengefulness and calculated reactions than Agreeableness which is, strictly speaking, contrary to expectations. Nonetheless, plausible differences between the factors were found concerning displaced aggression and the tendency toward immediate retaliation (though only in self-reports), both of which were more strongly predicted by Agreeableness than by Honesty–Humility. Overall, Lee and Ashton's results indicate that Honesty–Humility and Agreeableness are similarly relevant for the more general and long-term aspects of reactive cooperation, whereas Agreeableness is more relevant when it comes to short-term retaliation.

In summary, the distinction between Honesty–Humility and Agreeableness has received only partial support in studies concerned with aspects of reactive cooperation, so far. However, a dissociation between the two factors may yet be supported once considering active cooperation. Indeed, Honesty–Humility appears to be more strongly associated with low delinquency, less counterproductive work behavior, or less manipulativeness than Agreeableness (Ashton & Lee, 2008b; Lee, Ogunfowora, & Ashton, 2005; Marcus, Lee, & Ashton, 2007; Zettler & Hilbig, 2010b). However, it is unclear whether all of these measures can be considered precise representations of what constitutes active cooperation in the sense specified above (non-exploitation). Therefore, we will first present a set of re-analyses of the association between Honesty–Humility, Agreeableness, and measures specifically targeting active cooperation.

2. Re-analyses

2.1. Data and analytical strategy

Data from relatively diverse samples, all comprising self-reports of Honesty–Humility and Agreeableness as well as a measure of active cooperation were available. Specifically, data from prior published studies using the HEXACO-PI-R (Lee & Ashton, 2004, 2006) and scenario- or hypothetical-game-based measures of active cooperation were considered. First, the study by Hilbig and Zettler (2009) comprised a dictator game (e.g., Camerer & Thaler, 1995; Suleiman, 1996) which essentially measures ones willingness to share an endowment with an unknown stranger, even though the latter is powerless to retaliate. In the same study and, additionally, in a more recent one (Hilbig et al., in press, Study 2), participants provided responses to the triple-dominance measure of social value orientation (Van Lange, 1999; Van Lange, De Bruin, Otten, & Joireman, 1997) which assesses ones willingness to maximize joint outcomes (rather than exploiting the other). Given a powerless, purely receiving hypothetical other, this three-alternative forced-choice task also assesses active cooperation. Finally, in two studies (Hilbig, Zettler, & Heydasch, 2012) participants made contributions in a public goods game with complete anonymity (e.g. Dawes, 1980; Dawes & Messick, 2000). This, too, is a question

[1] Note that Perugini et al.'s scales were termed Forgiveness/Non-Retaliation and Fairness/Non-Exploitation; however, the content of these scales was later included in the HEXACO-PI-R to represent Agreeableness and Honesty-Humility, respectively.

of active cooperation since one can exploit others by free-riding without needing to fear punishment or retaliation. Note that all of these choice tasks bear the advantage of reduced common method variance with questionnaires (such as the HEXACO-PI) and thus allow for a stricter test of correlation-hypotheses.

According to the general hypothesis implied by the HEXACO model, Honesty–Humility but not Agreeableness should predict each of these criteria or, at least, Honesty–Humility should more strongly do so as compared to Agreeableness. To test this, we pursued a three-step analytical strategy with different levels of conclusiveness. First, the strongest case could be made through simultaneously corroborating the alternative hypothesis that Honesty–Humility is correlated with the criteria *and* the null hypothesis that Agreeableness is not. To do so, we determined the Bayesian posterior probability of these hypotheses given the data, using the BIC-approximation for R^2 (Raftery, 1995, Eq. 26; Wagenmakers, 2007) and assuming uniform priors. Second, representing a more lenient test, we compared the correlation between Honesty–Humility and the criterion with the correlation between Agreeableness and the criterion (using a *Z*-test for correlated correlation coefficients, Meng, Rosenthal, & Rubin, 1992), expecting that Honesty–Humility should be related more strongly to each criterion than Agreeableness. This test is more lenient because it would still allow for a correlation between Agreeableness and the criterion – so long as the corresponding correlation of Honesty–Humility is stronger. Third, we tested whether Honesty–Humility and/or Agreeableness predict unique variance in the criterion (testing the beta-weights of both factors in a multiple linear regression), expecting that Honesty–Humility, but not Agreeableness should do so. This is the most lenient test of the overall hypothesis, since it neither requires that Honesty–Humility be more strongly correlated with the criterion than Agreeableness, nor that Agreeableness be uncorrelated with the criterion.

2.2. Results and discussion

Since relevant descriptive statistics, reliabilities, and other details can be found in the corresponding original publications, we herein focus on the associations and differences in these associations between Honesty–Humility, Agreeableness, and the criteria sketched above. The findings are summarized in Table 1 which shows that Honesty–Humility was consistently and significantly related to the criteria in all data sets, with small to medium sized effects (Cohen, 1988). Agreeableness, on the other hand, maximally yielded small effect sizes, reaching statistical significance only in the very large samples. More importantly, the Bayesian analysis corroborated the hypothesized pattern: The posterior probability of a correlation between Honesty–Humility and the criteria can be considered positive evidence ($p(H|D) \geqslant .75$, cf. Wagenmakers, 2007) in two cases, strong evidence ($p(H|D) \geqslant .90$) in one case and very strong evidence ($p(H|D) \geqslant .99$) in the remaining two. At the same time, the posterior probability of a correlation between Agreeableness and the criteria actually implied positive evidence in favor of the null hypotheses (of no correlation) in four out of five cases. In the remaining case, the evidence was also in favor of the null hypothesis, though only weakly so. In all cases, testing the difference between correlation coefficients for statistical significance corroborated that Honesty–Humility was the stronger predictor. Finally, Honesty–Humility predicted unique variance in the criteria beyond Agreeableness in all data sets, whereas Agreeableness did not predict unique variance beyond Honesty–Humility in any of them.

In summary, these results confirm the expectation that Honesty–Humility, but not Agreeableness, is predictive of active cooperation. Whenever Agreeableness, too, was (weakly) related to the criterion, Honesty–Humility was the stronger predictor and the only one to predict unique variance in the criterion. As reasoned above, this pattern of selective association can be considered more conclusive support for the dissociation between Honesty–Humility and Agreeableness implied in the HEXACO model – as compared to the fact that Honesty–Humility and Agreeableness typically correlate only moderately.

3. Experiment

Although the previously reported re-analyses are in line with keeping Honesty–Humility and Agreeableness apart, a strong case would require replicating that Honesty–Humility (but not Agreeableness) predicts active cooperation and *concurrently* showing that Agreeableness (but not Honesty–Humility) is associated with reactive cooperation. To test this pattern of two selective associations, we conducted an experiment in which participants were randomly assigned to one of two hypothetical strategic-interaction games. These were selected to provide a behavioral measure of active and reactive cooperation, respectively. In the first, participants were assigned the role of allocator in the dictator game (e.g., Camerer & Thaler, 1995; Engel, 2011), thus splitting an endowment between themselves and an unknown recipient. As reasoned above, allocations in the dictator game can be considered a question of active cooperation, that is, non-exploitation despite one's power to exploit the other without facing retaliation (cf. Hilbig & Zettler, 2009). In the second experimental condition, participants' role was that of responder in the ultimatum game (Güth, Schmittberger, & Schwarze, 1982; Güth & Tietz, 1990). In this game, the proposer makes a suggestion for how to split an endowment between herself and the responder. If the responder accepts, the split is realized as suggested; if not, the endowment is lost and neither player receives a payoff (for variants see Suleiman, 1996). The responder thus has the option to retaliate by rejecting an offer. In turn, accepting even relatively low offers closely matches the concept of reactive cooperation, that is, non-retaliation even in the face of some exploitation by another (for a similar task logic, see Ashton, Paunonen, Helmes, & Jackson, 1998).

3.1. Materials, procedure, and participants

The experiment was run via the internet, adhering closely to common standards for web-based data collection (Reips, 2002). To reduce the dangers of spurious effects due to consistent responding, we separated the assessment of the HEXACO factors and the criterion (game behavior) in time. In one sub-study, participants responded to the German items of the 100-item HEXACO-PI-R (Lee & Ashton, 2004, 2006 for example items, see hexaco.org) on a five-point scale. This inventory has been used successfully in previous only studies with German samples (e.g. Zettler & Hilbig, 2010a). In the other sub-study, participants were shown a detailed explanation of the game – depending on the condition to which they had been randomly assigned: In the dictator game, they were asked to divide an endowment of 100 points between themselves and an unknown hypothetical recipient. In the ultimatum game, participants were asked to specify the number of points (out of 100) the proposer would need to offer at minimum in order for them to accept. It was explained that all offers below this "minimum to accept" would thus be rejected (leading to loss of the entire endowment and thus no payoffs for either player) and all larger offers realized as proposed. In both game conditions, it was emphasized that the points represent instances of positive utility. The exact instructions can be found in the online Supplementary materials to this article. Note that participants additionally completed a varying number of other tasks not pertinent to the current investigation.

To enable matching of participants across the sub-studies while upholding full anonymity, all participants generated an individual

Table 2
Means (standard deviations in parenthesis) and bivariate correlations of all variables with internal consistency reliabilities (Cronbach's alpha) in the diagonal.

	M (*SD*)	1.	2.	3.	4.	5.	6.
1. Honesty–Humility	3.65 (.55)	.84					
2. Emotionality	3.36 (.50)	.01	.80				
3. Extraversion	3.47 (.53)	.09	−.19**	.85			
4. Agreeableness	3.00 (.51)	.17**	−.23***	.14**	.83		
5. Conscientiousness	3.50 (.49)	.13*	−.01	.15**	−.09	.82	
6. Openness	3.50 (.50)	.20**	−.08	.15**	.06	.06	.76
Active cooperation[a]	42.0 (16.4)	.25**	.13	.09	.11	.10	.15*
Reactive cooperation[b]	62.5 (18.2)	−.01	−.06	−.08	.19**	−.05	.08

* $p < .05$ (all two-sided).
** $p < .01$ (all two-sided).
*** $p < .001$ (all two-sided).
[a] $N = 198$; points (out of 100) allocated to the recipient in the dictator game; larger values indicate a higher degree of cooperativeness.
[b] $N = 212$; 100 minus minimum to accept as recipient in the ultimatum game; larger values indicate a higher degree of cooperativeness.

pseudonymous code at the onset of each. Participants were recruited via the online-studies webpage of the Distance Teaching University of Hagen, Germany, which hosts links to multiple independent studies (for undergraduate psychology students to complete in return for course credit) and via email-lists and social networks. In the latter case, participants were compensated through the possibility to partake in a ballot for one of five 10€ vouchers from a large online retailer (by providing their email address which was stored separately from their responses).

We obtained a total of 472 exact code matches from participants who had completed the two studies with a time lag of at least 48 h,[2] though the typical time lag was substantially longer ($M = 94$ days, $SD = 228$ days). Out of these participants, 410 (87%) fulfilled all a priori criteria for inclusion into the final sample, namely (i) having indicated at least "good" grasp of German, (ii) having taken sufficient time for completing the game task (20 s for the dictator game, cf. Hilbig & Zettler, 2009, and 40 s for the ultimatum game)[3], and (iii) having provided a plausible response in the game task. Specifically, given that we used hypothetical scenarios only, there remains the danger of demand artifacts (Bardsley, 2008; Moshagen, Hilbig, & Musch, 2011) such that dictators claim they would allocate most or all of endowment to the recipient or responders indicating a "minimum to accept" of zero in the ultimatum game. Consequently, we excluded participants who claimed they would allocate the entire endowment to the recipient in the dictator game or would accept an offer of zero in the ultimatum game (neither of which actually ever occur in typical games with monetary incentives, e.g. Eckel & Grossman, 1996; Güth et al., 1982). This criterion applied to two participants in the dictator condition and none in the ultimatum condition. No cases of multiple participation (indicated by matching IP, sex, and age) were identified. Participants in the final sample (295 female) were aged between 18 and 73 years ($M = 30.6$ $SD = 11.4$). Most (46%) were students from diverse fields (35% psychologists), followed by 30% in full time employment and 14% part-time students/employees. A total of 198 participants were in the dictator game condition, whereas the remaining 212 completed the ultimatum game.

3.2. Results and discussion

Descriptive statistics, scale reliabilities, and bivariate correlations for all HEXACO factors and the degree of cooperation (conditional upon the game condition) are shown in Table 2. The analytical strategy for testing the hypothesized pattern was closely aligned with the re-analyses reported above. As expected, Honesty–Humility was significantly associated with active cooperation (dictator game giving), whereas Agreeableness was not. Correspondingly, the Bayesian posterior probability of a correlation between Honesty–Humility and active cooperation was p(H|D) = .97 which constitutes strong evidence, whereas the posterior probability of a correlation between Agreeableness and active cooperation was p(H|D) = .19, thus implying positive evidence for the null hypothesis. In turn, Agreeableness was significantly associated with reactive cooperation (the inverse of participants' minimum to accept), but Honesty–Humility was not. Confirming this pattern, the posterior probability of a correlation between Agreeableness and reactive cooperation was p(H|D) = .76 (positive evidence), but the posterior probability of a correlation between Honesty–Humility and reactive cooperation was p(H|D) = .06, implying strong evidence for the null hypothesis.

Comparing correlation coefficients (Meng et al., 1992) confirmed that the association between Honesty–Humility and active cooperation was stronger than the one between Agreeableness and the same criterion, $Z = 1.5$, $p = .03$, one-sided. Vice versa, the correlation between Agreeableness and reactive cooperation was significantly larger than the one between Honesty–Humility and said criterion ($Z = 2.2$, $p < .01$, one-sided). Multiple regression analyses with Honesty–Humility and Agreeableness as predictors and the degree of cooperation as criterion further confirmed that Honesty–Humility predicted unique variance in active cooperation ($\beta = .24$, $p < .01$), whereas Agreeableness did not ($\beta = .07$, $p = .32$). In turn, Agreeableness predicted unique variance in reactive cooperation ($\beta = .20$, $p < .01$), whereas Honesty–Humility did not ($\beta = -.04$, $p = .57$).

Overall, the results are well-aligned with the hypothesized pattern. Although effect sizes were relatively small, the findings confirm what is implied by the HEXACO model: That Honesty–Humility and Agreeableness represent individual differences in different, albeit related, aspects of cooperativeness. As confirmed by the most conclusive test (a Bayesian analysis allowing for concurrent approximation of the posterior probability of both the null and the alternative hypothesis), Honesty–Humility was shown to selectively predict active cooperation (non-exploitation in the dictator game), whereas Agreeableness was selectively associated with reactive cooperation (non-retaliation in the ultimatum game).

4. General discussion

In the HEXACO model of personality structure (Ashton & Lee, 2007, 2008a), a distinction is made between Honesty–Humility and Agreeableness. Though both relate to aspects of prosocial

[2] More strict criteria such as a lag of 7, 14 or 21 days did not alter the pattern of results, but merely reduced the sample size considerably.
[3] The minimum time for reading the entire instructions and providing a response in the ultimatum game condition was determined in a separate pre-study ($N = 40$) which showed that no participant was able to complete the task within less than 40 s.

behavior, they are assumed to cover different, complementary aspects of reciprocal altruism: Whereas Honesty–Humility stands for the willingness to cooperate even when one might exploit others, Agreeableness represents the tendency to cooperate even in the face of some level of exploitation. These two aspects, herein termed active vs. reactive cooperation, are arguably not equivalent and thus there may be good reason to distinguish between basic factors of personality underlying the two. However, empirically weak associations between the factors in question, Honesty–Humility and Agreeableness, merely represent necessary but not sufficient support for the theoretical dissociation implied by the HEXACO model. Rather, this type of conclusion requires that a pattern of two selective associations is shown. Specifically, it is necessary to critically test whether Honesty–Humility but not Agreeableness predicts non-exploitation, whereas Agreeableness but not Honesty–Humility is associated with non-retaliation.

Previous research on criteria related to reactive cooperation (e.g. Lee & Ashton, 2012; Shepherd & Belicki, 2008; Sheppard & Boon, 2012) has mostly produced mixed results in comparing Honesty–Humility and Agreeableness. Although Agreeableness appears to relate consistently to most forms of reactive cooperation, but Honesty-Humility only to some (e.g. calculated revenge), there is relatively little support for or against a *selective* association between Agreeableness and (non-)retaliation. Clearly, this state is unsatisfactory. By contrast, concerning active cooperation, more positive evidence for the selective role of Honesty–Humility can be found (Ashton & Lee, 2008a; Hilbig et al., in press). Indeed, in re-analyses of several published data sets, we found a relatively clear pattern confirming the first of the two selective association hypotheses. Specifically, Honesty–Humility but not Agreeableness predicted various criteria, all of which are relatively pure measures of non-exploitation and thus active cooperation.

Nonetheless, to test the full pattern of two selective associations, we conducted a new experiment, manipulating between participants whether non-exploitation or non-retaliation was the decisive dependent variable. Specifically, participants either made allocations in the dictator game or reported their minimum to accept in the role of recipient in the ultimatum game (Camerer & Thaler, 1995; Güth et al., 1982; Suleiman, 1996). Summarized briefly, the results confirmed both selective association hypotheses – despite rather small effect sizes.

Of course, it should be noted that neither the dictator nor ultimatum game will be perfectly reliable or valid indicators of active or reactive cooperation. Although previous work indicates that individual preferences in economic games are quite consistent and stable (Murphy, Ackermann, & Handgraaf, 2011), short-term situational influence will nonetheless be stronger than in typical personality questionnaires which are designed to minimize situational influences. In terms of validity, it must also be noted that behavior in both games is additionally influenced by social norms and, more importantly, ones expectations about the behavior of others. Also, the ultimatum game cannot be considered a "pure" measure of reactive cooperation because one's reaction to an offer is not only driven by whether or not one wants to retaliate (punish the proposer for an unfair offer), but also by one's desire to make profit (which actually suggests to accept any offer larger than zero, Güth et al., 1982).

In summary, we conclude that there is growing support for the separation between Honesty–Humility and Agreeableness as implied by the HEXACO model of personality (Ashton & Lee, 2007). First, lexical studies suggest such a separation. Also, empirical investigations typically find only small to moderate correlations between the two. More importantly, at least some previous studies (and our own re-analyses) have reported differences between the two factors in terms of predicting diverse criteria which can be considered aspects of active or reactive cooperation. Finally, the current experiment confirmed a pattern of two selective associations with Honesty–Humility but not Agreeableness predicting active cooperation and vice versa for reactive cooperation. We consider this a sufficient condition for the dissociation of Honesty–Humility and Agreeableness, especially if future research replicates this pattern and extends it to other criteria representing active and reactive cooperation.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.paid.2012.11.008.

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