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ORIGINAL PAPER

Honesty and Dishonesty Don't Move Together: Trait Content Information Influences Behavioral Synchrony

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Abstract Emerging evidence revealed that honesty and trustworthiness are important drivers of the impression-formation process. Questions remain, however, regarding the role of these moral attributes in guiding real and concrete behaviors. Filling this gap, the present study investigated the influence of honesty on a nonverbal behavior that regulates social interactions: behavioral synchrony. Movements were recorded while participants interacted with a partner who was depicted as honest (versus dishonest) or as friendly (versus unfriendly). Results showed that synchrony was affected only by the honesty of the partner. Specifically, the more the interaction partner lacked honesty, the lower the perceived similarity between the self and the interaction partner, which in turn diminished the promptness to engage in behavioral synchrony. Our findings connected the literature on behavioral synchrony with that on the implication of morality for social perception, revealing the key role of the honesty facet of moral character in shaping nonverbal behaviors.

Keywords Morality · Honesty · Synchrony · Social perception · Nonverbal behavior

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Introduction

A growing body of research has revealed that individuals are fundamentally motivated to evaluate others on a socio-moral dimension (Abele and Bruckmuller 2011; De Bruin and Van Lange 1999, 2000; Fiske et al. 2007; Wojciszke et al. 1998; for a review, see Wojciszke 2005). Indeed, when people interact with others, they are mainly interested in establishing whether someone's intentions are beneficial or harmful and whether it is safe to approach a social target (Cuddy et al. 2008; Ybarra et al. 2001). The socio-moral dimension, comprising traits related to human benevolence, assesses the other's perceived intent in the social context and represents an important driver of person and group perception (Fiske et al. 2007).

More recently, it has been shown that the socio-moral dimension comprises distinct evaluative components and that honesty and trustworthiness tend to be far more important than other socio-moral characteristics, such as friendliness and likeability, in establishing others' intentions and in shaping person and group perception (Brambilla and Leach 2014; Brambilla et al. 2013; Goodwin 2015; Goodwin et al. 2014). Indeed, people quickly and spontaneously infer other's trustworthiness on the basis of very little information (Todorov et al. 2008; Willis and Todorov 2006) and show a memory advantage for faces varying on honesty and trustworthiness compared with those varying on likeability and friendliness (Rule et al. 2012). In a similar vein, global impressions of individuals and groups are better predicted by information about the target's honesty and trustworthiness than by information pertaining to other characteristics (i.e., friendliness, likeability, and intelligence) (Brambilla and Leach 2014; Cottrell et al. 2007; Goodwin et al. 2014; Leach et al. 2007; Pagliaro et al. 2013). Thus, individuals rate trustworthiness as the most desirable characteristic for an ideal person to possess (Cottrell et al. 2007), and honesty is key in order to define whether someone is an opportunity or a threat (Brambilla et al. 2013). Furthermore, honesty and trustworthiness judgments play a prominent role in shaping ingroup pride and identification (Leach et al. 2007).

These insights aside, remarkably little is known about how such moral qualities of a target impact upon subsequent behaviors that regulate social interactions. Moreover, most studies in this area have considered explicit responses, overlooking nonverbal responses. Thus, one intriguing question is whether the prominent role of honesty and trustworthiness qualities of moral character in social judgment extends beyond overall perceptions and initial impressions to influence nonverbal behaviors. We tested this possibility by considering the honesty facet of moral character and by investigating how such a moral attribute impacts a nonverbal behavior that regulates social interactions: interpersonal synchrony (Semin 2007; Semin and Cacioppo 2008).

Interpersonal Synchrony and Honesty

Research has long noted that in everyday life people spontaneously coordinate their actions with those of an interaction partner (Cappella 1997; Chartrand and Bargh 1999). As such, interpersonal coordination is typically divided between mimicry and synchrony (Bernieri and Rosenthal 1991). Mimicry refers to the taking of postures, gestures, face expressions, and mannerisms of interaction partners (Chartrand and Bargh 1999; Lakin et al. 2003). By contrast, interactional synchrony implies that the bodily movements of co-actors are coordinated in both form (i.e., the manner and style of movements) and time (i.e., the

temporal rhythm of movements). In other words, synchrony implies that the interactional partners make the same actions simultaneously (Semin 2007; Semin and Cacioppo 2008). Such a synchronization of behaviors is a robust tendency in human behavior that may occur either spontaneously and without individual awareness (Strogatz 2003; van Ulzen et al. 2008) or under conditions of complete conscious direction and explicit instruction (Lumsden et al. 2014).

Synchrony is unanimously considered as a basic facet of human interaction that is functional for bonding people together (Semin 2007; Semin and Cacioppo 2008). Specifically, a good deal of work has shown that acting in synchrony elicits feelings of connectedness and social cohesion, increases affiliation, and promotes cooperative behaviors (Hove and Risen 2009; Macrae et al. 2008; Valdesolo et al. 2010; Wiltermuth and Heath 2009). In a similar vein, synchrony fosters compassion and altruistic behaviors (Valdesolo and DeSteno 2011). Recent work has also revealed that behavioral synchrony is influenced by the social context and that individuals are less likely to synchronize their movements with partners with whom they anticipate a negative interaction (because the partner turned up late for the experimental session) (Miles et al. 2010).

Departing from this body of work, we investigated whether the coordination dynamics that underlie interpersonal synchrony are influenced by the moral characteristics describing the partner involved in the interaction. This might help to extend prior findings on the factors promoting or disrupting interpersonal synchrony as well as the work on the behavioral implication of morality. Indeed, prior evidence suggests that individuals are less likely to coordinate their actions with those toward whom they anticipate a negative interaction (Miles et al. 2010) but did not define the specific person characteristics that may enhance or diminish behavioral synchrony. In a similar vein, the key role of morality—in particular of honesty and trustworthiness—in shaping initial impressions and evaluations in interpersonal relations raises the question of whether moral attributes also impact upon nonverbal responses as a way to gain more insight into the behavioral implications of morality. Importantly, a good deal of work has shown that interpersonal synchrony is a pathway through which people influence each other, affecting the development of social interactions (Hove and Risen 2009; Semin 2007; Semin and Cacioppo 2008). Thus, to be able to fully understand how and why some facets of moral character constitute such important factors in social judgment, we need to broaden our understanding of how such moral attributes affect nonverbal responses that precede socially meaningful behaviors.

Thus, we investigated whether honesty-trait information of an individual person influences interpersonal synchrony. Considering that it has been shown that honesty strongly influences person perception (for a review, Brambilla and Leach 2014; Goodwin 2015), one possibility is that the coordination dynamics that underlie interpersonal synchrony may be more sensitive to variations on a target's honesty than to variation on other facets of the socio-moral character. We explored this possibility in the current work by manipulating honesty and friendliness. Indeed, although honesty and friendliness are two prosocial characteristics referring to the broader socio-moral dimension, they play distinct roles in the impression-formation process (Brambilla and Leach 2014; Goodwin 2015; Goodwin et al. 2014). Honesty characteristics tend to be far more important than friendliness characteristics in order to establish someone's intentions (Brambilla and Leach 2014). Accordingly, we predicted that interpersonal synchrony would be more sensitive to variations on a target's honesty than on target's friendliness.

Two distinct processes might lie at the basis of this hypothesized effect. Given the key role of honesty in the impression-formation process (Brambilla and Leach 2014; Goodwin et al. 2014), one possibility is that overall impressions (i.e., impressions regarding the

goodness vs. badness of a social target) about the interactional partner would trigger the hypothesized effect of honesty on behavioral synchrony. Thus, the more an individual is dishonest, the more it is likely to elicit negative impressions, which in turn should diminish behavioral synchrony.

A second potential mechanism that might explain the hypothesized effect of honesty on behavioral synchrony is perceived similarity between the self and the interaction partner. Prior research has shown that honesty influences perceived similarity such that individuals feel more similar to highly honest individuals rather than to those who lack honesty (Allison et al. 1989; van Lange and Sedikides 1998). Indeed, honesty is a highly valued trait and individuals tend to feel similar to those they like (Byrne 1971). In a similar vein, perceived self-other overlap and interpersonal coordination are inherently linked. As a case in point, people show greater mimicry when they interact with an ingroup member (who is supposed to be perceived as more similar to the self) than when they interact with an outgroup member (Yabar et al. 2006). Thus, one might expect that the more an individual is dishonest, the less he/she should be perceived as similar to the self, which in turn should diminish behavioral synchrony.

Method

Participants

Ninety-two students from the University of Milano-Bicocca (Italy) voluntarily took part in the study. However, six participants were excluded because they failed to follow the instructions. We further excluded seven participants that unmasked the confederate involved in the experiment, leaving thus a total of seventy-nine participants (34 male, 45 females, M_{age} = 22.87, SD = 5.01).

Materials and Procedure

Students were asked to participate in a study about interpersonal interactions that required two individuals to take part. The supposed other participant was in fact a male confederate who was already present when the participant arrived at the laboratory. Before starting the interaction task both the participant and the confederate were asked to present themselves by writing on a lined sheet of paper about a recent personal past experience. This task was framed as an initial task that might help the supposed two participants to start knowing each other. Then, both the participant and the confederate were given 2 min to read each other's story. We employed a 2 (dimension: honesty vs. friendliness) × 2 (valence: negative vs. positive) between-participants design. Participants were randomly assigned to one of the four conditions.

Thus, in the honest condition, the confederate wrote that he went to the cinema and that he found a wallet with 300 Euros near his seat. He went to the reception desk and helped to find the owner of the wallet. In the dishonest condition, the confederate wrote that after finding the wallet he took the money and left the cinema. In the friendly condition, the confederate wrote that he went out for dinner with a friend and some other people that he hadn't met before. Despite this, he was friendly with everybody and talked to his friend's guests. In the unfriendly condition, the confederate wrote that he was rude and unfriendly with the guests (see "Appendix" section). To ascertain that the stories employed in the

experiment were perceived as related to either honesty or friendliness, we asked 66 students (M_{age} = 24.58; SD = 8.13) not involved in the main study to rate the stories on their honesty- and friendliness-relatedness on two separate scales ranging from 1 (*not at all*) to 7 (*extremely*). Pre-test results revealed an interaction effect between the manipulated dimension and the relatedness scores, $F(1,61) = 33.64$, $p = .001$, $\eta_p^2 = .33$, such that the honest and dishonest stories were rated as more related to honesty ($M = 5.56$, $SD = 2.15$) than to friendliness ($M = 3.63$, $SD = 1.84$), $p = .001$. By contrast, the friendly and unfriendly stories were rated as more related to friendliness ($M = 4.92$, $SD = 1.93$) than to honesty ($M = 3.21$, $SD = 1.47$), $p = .001$.

After reading the stories, the participant and the confederate were asked to report their global impression of the partner involved in the experiment without revealing the score to each other (i.e., 'What is your global impression of the other participant?'), using a seven-point scale ranging from −3 (*extremely negative*) to +3 (*extremely positive*) (see, De Bruin and Van Lange 1999).

Then, we introduced the synchrony task. Participants were told that the task was interested in exploring the motor skills of the student population. The participant and the confederate were supposedly randomly assigned to either the role of model or to the role of mimicker. Actually, the confederate always acted as the model and the participant as the mimicker. Next, the confederate and the participant were asked to seat opposite each other and the mimicker was asked to imitate the model's movements simultaneously. Their movements were recorded by a webcam. In all the experimental conditions, the confederate performed a total of 20 movements, following the same order. Each movement started and ended with the hands on the table with a break of 5 s between each movement. In particular, the confederate performed neutral movements that were not incorporated into a conversation. The first 4 movements were used as practice trials; the last 16 as

Fig. 1 Movement sequence employed in the Study (Experimental trials)

experimental trials (Fig. 1 displays the sequence of movements). The movements lasted 2.87 s on average and the whole interaction took around 3 min[1].

After the imitation task, participants were asked to report their global impression of the partner involved in the experiment using the same item employed before the interaction. Then, participants were asked to evaluate themselves and the confederate on 3 honesty traits (i.e., sincere, honest, and trustworthy) and 3 friendliness-related traits (i.e., friendly, kind, and sociable).

Participants provided all their responses on 7-point scales, ranging from 1 (*not at all*) to 7 (*extremely*). At the end of the experiment, participants were thanked and fully debriefed.

Results

First, we reported the results concerning the effect of the trait content manipulation on the global impression of the confederate and on the perceived similarity between the participant and the confederate. Second, we detailed the effects of the manipulation on behavioral synchrony. Third, we reported the mediation analyses testing whether global impressions and perceived similarity mediated the effect of the trait content manipulation on behavioral synchrony. Finally, we reported additional analyses aimed at ruling out alternative explanations for our findings.

Overall Impressions

First, we submitted the global impression of the partner (i.e., the confederate) to a 2 (dimension: honesty vs. friendliness) × 2 (valence: negative vs. positive) × 2 (time: pre- vs. post-interaction) ANOVA with the first two factors varying between-participants and the last one within-participants. The analysis yielded an expected main effect of valence, $F(1, 71) = 35.76$, $p < .001$, $\eta_p^2 = .33$. Participants rated the confederate who described a negative episode ($M = -.18$, $SD = 1.42$) less favorably than the confederate describing a positive event ($M = 1.38$, $SD = 1.04$). More crucially, we found a dimension by valence interaction, $F(1, 71) = 9.33$, $p = .003$, $\eta_p^2 = .12$ (see Table 1 for means). Thus, the highly honest partner elicited more positive impressions than the highly friendly partner, $t(38) = 2.15$, $p = .04$, $d = .16$, 95 % CI [−.46, .78]. By contrast, the dishonest partner elicited more negative impressions than the unfriendly one, $t(36) = 2.19$, $p = .04$, $d = .17$, 95 % CI [−.81, .47]. The difference between the friendly and unfriendly conditions was significant, $t(35) = 2.59$, $p = .01$, $d = .20$, 95 % CI [−.84, .45], but less prominent than between the honest and dishonest conditions, $t(39) = 6.05$, $p < .001$, $d = .44$, 95 % CI [−1.06, .18], effect-size comparison (Rosenthal and Rosnow 1984): $z = 1.85$, $p = .03$. We further found a three way interaction, $F(1, 71) = 4.31$, $p = .04$, $\eta_p^2 = .05$, showing that the interaction between valence and dimension on the first measure of impression, $F(1, 73) = 12.10$, $p = .001$, $\eta_p^2 = .14$, decreased after the interaction task, $F(1, 72) = 2.66$,

[1] A pretest confirmed that the 16 key movements were not perceived as threatening. Indeed, 15 students ($M_{age} = 22.00$, $SD = 1.89$) not involved in the main study were asked to indicate the extent to which each movement appeared as threatening using a scale ranging from 1 (*not at all*) to 7 (*extremely*). Results showed that all the scores were below the midpoint of the scale, revealing thus that the movements were perceived as not threatening. Only one movement (i.e., point two fingers of the right hand) was perceived as mildly threatening. However, the main findings on the qualitative index of synchrony [$F(1, 75) = 4.17$, $p = .04$, $\eta_p^2 = .05$] and on the promptness to synchronize [$F(1, 75) = 3.86$, $p = .05$, $\eta_p^2 = .05$] did not change when we excluded such a movement from the analysis.

Table 1 Means (standard deviations) of global impressions about the partner by valence and dimension pre- and post-interaction

	Pre-interaction		Post-interaction	
	Morality	Sociability	Morality	Sociability
Negative	−.60 (2.11)	.35 (.86)	−.60 (1.50)	.12 (1.22)
Positive	2.29 (.78)	1.00 (1.41)	1.24 (1.04)	1.00 (.93)

$p = .10$, $\eta_p^2 = .04$. Taken together, these findings revealed that honesty has a leading role over friendliness in driving global impressions.

Perceived Similarity

To test whether honesty and friendliness represented two distinct characteristics, we carried out a factor analysis with Varimax rotation on traits attributed to the self and traits attributed to the confederate. The analysis on self-perception confirmed that the items fall into two distinct factors, representing honesty (factor loadings: sincere = .77, honest = .81, trustworthy = .84) and friendliness (factor loadings: friendly = .89, kind = .74, sociable = .85), which account for 70.84 % of the variance. The analysis on the confederate revealed the same two factors, i.e., honesty (factor loadings: sincere = .79, honest = .88, trustworthy = .86) and friendliness (factor loadings: friendly = .80, kind = .87, sociable = .82) which account for 76.17 % of the variance.

Next, to analyze the effect of our manipulation on the perceived similarity between the self and the other, we subtracted the rating of honesty ($\alpha = .85$) and friendliness ($\alpha = .83$) traits that participants attributed to the confederate from the rating of honesty ($\alpha = .75$) and friendliness ($\alpha = .79$) traits that participants attributed to themselves. Thus, a positive index indicates a greater dissimilarity and a better evaluation of the self when compared to the other.

We carried out a 2 (dimension: honesty vs. friendliness) × 2 (valence: negative vs. positive) × 2 (traits: honesty vs. friendliness) ANOVA with the first two factors varying between-participants and the last one within-participants. The analysis yielded a main effect of valence, $F(1, 73) = 13.19$, $p = .001$, $\eta_p^2 = .15$. The dissimilarity between the participants' self-evaluation and the confederate evaluation was larger when the interaction partner reported a negative behavior ($M = 1.50$, $SD = 1.33$) than when he evoked a positive behavior ($M = .70$, $SD = 1.05$). We further found a three-way interaction between traits, valence, and dimension, $F(1, 73) = 15.87$, $p < .001$, $\eta_p^2 = .18$ (Table 2). The difference between the perception of the self and of the other on friendliness-related traits was greater when the partner described himself as unfriendly than friendly, $t(35) = 2.13$, $p = .04$, $d = .17$, 95 % CI [−.48, .81]; the analysis did not yield any difference between the unfriendly and friendly condition on honesty-related traits, $t(35) = 1.10$, $p = .28$. By contrast, the difference between the perception of the self and of the other on honesty-related traits was greater when the partner described himself as dishonest than honest, $t(38) = 6.09$, $p < .001$, $d = .44$, 95 % CI [−.18, 1.07]; the analysis did not reveal any difference between the dishonest and honest condition on friendliness-related traits, $t(38) = 1.55$, $p = .13$. Since the difference between the dishonest and honest condition on honesty traits was greater than the difference between the friendly and unfriendly condition on friendliness traits ($z = 2.13$, $p = .02$), we further found a two-way

Table 2 Means (standard deviations) of the difference between the self and the other on honesty-related traits and friendliness-related traits

	Morality		Sociability	
	Morality traits	Sociability traits	Morality traits	Sociability traits
Negative	2.84 (1.18)	1.07 (1.41)	.61 (1.26)	1.47 (1.47)
Positive	.78 (.96)	.41 (1.28)	1.04 (1.06)	.61 (.91)

interaction effect between traits and dimension, $F(1, 73) = 7.67$, $p = .007$, $\eta_p^2 = .09$, and a main effect of traits, $F(1, 73) = 6.35$, $p = .01$, $\eta_p^2 = .08$. Hence, participants perceived themselves better than the partner on honesty-related traits ($M = 1.31$, $SD = 1.41$) than on friendliness-related traits ($M = .88$, $SD = 1.33$), $t(76) = 2.16$, $p = .03$, $d = .04$, 95 % CI [−.33, .28]. Finally, we found a two-way interaction between dimension and valence, $F(1, 73) = 6.88$, $p = .01$, $\eta_p^2 = .09$. The difference between the self and the dishonest partner was greater than the distance between the self and the unfriendly one, $t(36) = 2.78$, $p = .009$, $d = .21$, 95 % CI [−.42, .85], whereas there was no difference in the perceived similarity between the self and the honest or the friendly target $t(37) = .80$, $p = .43$. To sum up, these findings revealed that honesty has a greater influence on perceived similarity than friendliness.

Synchrony

Three independent judges blinded to the experimental conditions were presented with the videos and instructed to evaluate the sixteen movements for each participant on seven qualitative criteria (Bernieri et al. 1988; Vacharkulksemsuk and Fredrickson 2012): the mimicker's movement started at the same time of the model's movement (start); the movements ended at the same time (end); the mimicker and the model moved synchronically (synchrony); the mimicker and the model moved at the similar speed (speed); the mimicker precisely imitated the model (rigor); the mimicker's movement was fluid (fluidity); the mimicker's movement was awkward (clumsiness). The judges provided their answers on four-point scales ranging from 1 (*not at all*) to 4 (*extremely*). For each participant, we ran a within-subject correlation between the seven evaluations of judge 1 and of judge 2 ($r = .75$), between the seven evaluations of judge 1 and of judge 3 ($r = .66$) and between the seven evaluations of judge 2 and of judge 3 ($r = .77$). Since the judges' agreement proved to be satisfactory ($r_{mean} = .73$), the evaluations have been averaged. An exploratory factor analysis (maximum likelihood method with Varimax rotation) indicated a two-factor solution (83 % of variance): the first factor, Time ($\alpha = .96$), included the four items related to the temporal rhythm of actions (start, end, synchrony, and speed); the second factor, Form ($\alpha = .76$), included the three items related to the quality of the movements (rigor, fluidity, and the reverse score of clumsiness). This distinction is in line with previous works, highlighting that behavioral synchrony can be defined by both the temporal rhythm and the style of actions (Kimura and Daibo 2006). On these two composite scores, we carried out a 2 (dimension: honesty vs. friendliness) × 2 (valence: negative vs. positive) ANOVA. On Time, the analysis yielded neither a main effect of dimension, $F(1, 75) = 1.27$, $p = .26$, nor of valence, $F(1, 75) = .39$, $p = .53$. However, we found a two-way interaction, $F(1, 75) = 4.48$, $p = .04$, $\eta_p^2 = .06$ (Table 3). Whereas

Table 3 Means (Standard Deviations) of Time coded by the three independent judges by valence and dimension

	Morality	Sociability
Negative	2.47 (.35)	2.77 (.39)
Positive	2.73 (.42)	2.64 (.48)

participants' imitation of the unfriendly and the friendly partner were judged equally synchronic, $t(36) = .98$, $p = .33$, the temporal synchrony with the dishonest partner was judged lower than the temporal synchrony with the honest model, $t(39) = 2.10$, $p = .04$, $d = .67$, 95 % CI [−1.30, −.04]. Furthermore, Time scores obtained by participants synchronizing with the dishonest partner was lower than the scores obtained by participants imitating the unfriendly one, $t(37) = 2.53$, $p = .02$, $d = .81$, 95 % CI [−1.46, −.16], whereas there was no difference in Time in synchronizing with friendly and honest partners, $t(38) = .65$, $p = .52$. The analysis did not yield any effect on Form score, $Fs(1, 75) < .77$, $ps > .38$.

In order to support the judges' qualitative analysis, all recorded experimental sessions were further analyzed with the Observer XT software by a highly trained coder. Blind to the participants' experimental condition, for each trial, the coder coded the time the model started the movement and the time the mimicker started the imitation of the same movement. Then the delay was computed subtracting the model's time from mimicker's time. Such a delay which was negatively correlated with Time ($r = -.43$, $p < .001$) was used as an index of promptness to synchronize (Bernieri et al. 1988). The delays (in s) for the 16 movements were averaged into a composite score which was submitted to a 2 (dimension: honesty vs. friendliness) × 2 (valence: negative vs. positive) ANOVA (Table 4). The analysis revealed an interaction between dimension and valence, $F(1, 75) = 3.71, p = .05, \eta_p^2 = .05$. Whereas participants were equally prompt to synchronize with the unfriendly and the friendly partner, $t(36) = .35, p = .73$, they proved to be less ready to synchronize with the dishonest partner than with the honest one, $t(39) = 2.43, p = .02, d = .17$, 95 % CI [−.44, .78]. Furthermore, the delay in synchronizing with the dishonest partner was higher than the delay in synchronizing with the unfriendly one, $t(37) = 2.50, p = .02, d = .19$, 95 % CI [−.44, .82], whereas there was no difference between the friendly and the honest partner, $t(38) = .28, p = .78$. The analysis did not yield a main effect of dimension, $F(1, 75) = 2.34, p = .13$, nor of valence, $F(1, 75) = 2.00, p = .16$[2].

Mediation Analysis

We explored the possible underlying mechanisms of the effect of trait dimensions on synchrony through a moderated mediation analyses using PROCESS macro (Hayes 2013;

[2] Since in our experiment the confederate was a male, we explored whether participants' gender played a role in driving our results. We run a series of 2 (dimension: honesty vs. friendliness) × 2 (valence: negative vs. positive) × 2 (gender: male vs. female) ANOVAs on our key variables: global impression, perceived similarity, and the two indexes of synchrony. The analyses revealed neither main effects of gender, $Fs(1, 71) < 2.34$, $ps > .13$, nor two-way interaction effects, $Fs(1, 71) < 2.46$, $ps > .12$, nor three-way interaction effects, $Fs(1, 71) < .96$, $ps > .33$. For similar findings, see Dimberg and Lundqvist, 1990.

Table 4 Means (standard deviations) of the delay in synchronizing movements with those of the interaction partner by valence and dimension (in secs)

	Morality	Sociability
Negative	.78 (.22)	.62 (.17)
Positive	.63 (.18)	.65 (.23)

model 7, 5000 bootstrap resampling) with "valence" as independent variable, "dimension" as moderator, "global impression" as a first mediator, "perceived similarity with the partner" as the second mediator, and "promptness to synchronize" as the dependent variable.

The moderated mediation analysis indicated that the total indirect effect using perceived similarity as the mediator was significant, $b = -.06$, $SE = .04$, 95 % CI [− .15, −.006], whereas the total indirect effect using the impression as mediator was not significant, $b = -.03$, $SE = .04$, 95 % CI [−.13, .03]. When the two mediators were introduced in the model, the effect of valence ($b = .01$, $SE = .06$, $t = .28$, $p = .78$, LLCI = −.09, ULCI = .13) and of impression ($b = -.02$, $SE = .02$, $t = -1.08$, $p = .28$, LLCI = −.06, ULCI = .02) on promptness to synchronize were not significant, whereas the effect of perceived similarity ($b = .05$, $SE = .02$, $t = 2.03$, $p = .04$, LLCI = .00, ULCI = .10) was significant. Thus, perceived similarity fully accounted for the effect on synchrony when honesty was manipulated, $b = -.07$, $SE = .03$, 95 % CI [− .15, −.006], whereas the model was not significant when friendliness was manipulated, $b = -.01$, $SE = .02$, 95 % CI [− .05, .02].

The same model was run considering the judges' qualitative index "time" as the dependent variable. Consistent with the previous analysis, the model indicated that the total indirect effect using perceived similarity as the mediator was significant, $b = .16$, $SE = .09$, 95 % CI [.02, .36], whereas the total indirect effect using impression as the mediator was not significant, $b = -.001$, $SE = .07$, 95 % CI [− .14, .14]. When the two mediators were introduced in the model, the effect of valence ($b = -.06$, $SE = .12$, $t = -.49$, $p = .62$, LLCI = −.29, ULCI = .18) and of impression ($b = -.001$, $SE = .04$, $t = -.01$, $p = .98$, LLCI = −.09, ULCI = .08) on time were not significant, whereas the effect of perceived similarity ($b = -.13$, $SE = .05$, $t = -2.64$, $p = .01$, LLCI = −.23, ULCI = −.03) was significant. Perceived similarity fully accounted for the effect on time when honesty was manipulated, $b = .18$, $SE = .08$, 95 % CI [.05, .37], whereas the model was not significant when friendliness was manipulated, $b = .02$, $SE = .04$, 95 % CI [− .05, .11][3]. We tested alternative models using synchrony indices as mediators and perceived similarity as the dependent variable. However, none of these models was significant.

[3] To compute a single index of global impression we averaged the measure of impression assessed before and after the interaction task. We obtained analogous results using the single pre-imitation or the post-imitation measure of global impression as a mediator. The total indirect effect using pre-imitation impression was not significant neither on promptness to synchronize, $b = -.02$, $SE = .04$, 95% CI [-.11, .06], nor on Time, $b = -.03$, $SE = .08$, 95% CI [-.20, .12]. Consistently, the total indirect effect using post-imitation impression was not significant neither on promptness to synchronize, $b = -.03$, $SE = .03$, 95% CI [-.11, .005], nor on Time, $b = .02$, $SE = .04$, 95% CI [-.02, .16].

Supplementary Analyses

We conducted additional analyses to ascertain that the confederate performed the movements implied in the synchrony task in the same way across the experimental conditions. Thus, two new independent judges, blind to the experimental conditions, were asked to watch the videos and to indicate the extent to which the confederate appeared hostile, rude, and happy (reverse-scored) during the synchrony task. The judges provided their answers on four-point scales ranging from 1 (*not at all*) to 4 (*extremely*). We computed a global index (alpha .69) that was submitted to a 2 (dimension: honesty vs. friendliness) × 2 (valence: negative vs. positive) ANOVA. We did not find a main effect of dimension, $F(1, 75) = .47$, $p = .50$, $\eta_p^2 = .006$, of valence, $F(1, 75) = 1.49$, $p = .22$, $\eta_p^2 = .02$, or the interaction effect, $F(1, 75) = .78$, $p = .38$, $\eta_p^2 = .01$. We further asked the two independent judges to indicate the extent to which the confederate appeared as helping the participant in the synchrony task and the extent to which the confederate had an avoidant attitude during the synchrony task. On these two different items, we carried out a 2 (dimension: honesty vs. friendliness) × 2 (valence: negative vs. positive) ANOVA. We did not find any significant results, $Fs(1,75) < 1.49$, $ps > .38$, confirming that the confederate performed the synchrony task in the same way in the various experimental conditions.

We further explored whether our findings might be due to participants' bodily tension. Indeed, it is possible that a confederate low in honesty triggered participants' body tension that, in turn, might have interfered with the ability to mimic the confederate's movements. Thus, we asked two new independent judges (blind to the experimental conditions) to watch the videos and indicate the extent to which the participant appeared tense (i.e., tense, worried, rigid, relaxed, calm, and at ease) during the synchrony task. Positive items were reverse scored to create an index of perceived tension (alpha: .91). A 2 (dimension: honesty vs. friendliness) × 2 (valence: negative vs. positive) ANOVA on perceived bodily tension yielded a main effect of valence, $F(1, 75) = 5.08$, $p = .027$, $\eta_p^{2\,=} .063$. Participants appeared more tense when the confederate reported a negative behavior ($M = 1.84$, $SD = .34$) than when he reported a positive behavior ($M = 1.66$, $SD = .35$). The analysis did not yield either a main effect of dimension, $F(1, 75) = .07$, $p = .79$, or the dimension by valence interaction effect, $F(1, 75) = .07$, $p = .80$. Since the two negative conditions elicited the same level of tension among participants, this factor could not account for our key finding showing a difference in behavioral synchrony between the dishonest and unfriendly conditions. In a similar vein, bodily tension cannot explain the different pattern of results we found between the honest and dishonest conditions and between the friendly and unfriendly conditions.

Discussion

Honesty-trait information influences the temporal coordination of interpersonal behavior. Indeed, our study suggests that individuals are less likely to synchronize their movements with those of an interaction partner lacking honesty qualities. Specifically, we found that the more the interaction partner lacked honesty, the lower the perceived similarity between the self and such a social target, which in turn diminished behavioral synchrony. Importantly, we found this effect considering two distinct indices of synchrony (i.e., observations of independent coders and objective measure of temporal coordination), thus confirming

the robustness of our findings. Our study further shows the specific role of the honesty facet of the socio-moral character in this sense, as differential perceptions of the target's friendliness had no comparable effect on the behavioral synchrony.

As they stand, these findings provide an original contribution for the interpersonal synchrony literature. Most studies in this area have considered the effect of synchrony for social relations, leaving less explored the factors promoting or disrupting the temporal coordination of interpersonal behavior. Indeed, prior research has shown that individuals do not coordinate their actions with people with whom they anticipate a negative interaction (Miles et al. 2010) without testing whether specific person characteristics impact behavioral synchrony. Our findings show that person characteristics influence the coordination of movements. We further showed that person characteristics are not all alike and that honesty has an exclusive and distinctive role in this sense. As a case in point, we showed that the honesty facet of moral character predicts the coordination of behaviors during social interaction over and beyond other socio-moral characteristics. Taken together, these findings provide support to the notion that synchrony is not inevitable, but is a flexible social behavior that is influenced by social context (see, Lumsden et al. 2012). A further point of novelty of the present study is that we found consistent effects on two different measures of interpersonal synchrony, proving that the impact of honesty attributes on the temporal coordination of movements can be detected using both a qualitative and a quantitative measure.

Importantly, our study identified the underlying mechanism through which (dis)honesty impacts interpersonal synchrony. We found that individuals are less likely to coordinate their actions with those of an interaction partner lacking honesty because a dishonest interaction partner is perceived as not similar to the self. By contrast, we found that the overall impression elicited by dishonest (vs. honest) individuals does not drive this effect. Thus, although honesty is key in shaping both overall impressions and the perception of similarity between the self and others (Brambilla and Leach 2014), only the latter accounts for the role of honesty in shaping interpersonal synchrony. These findings are in line with those showing that synchrony is functional to people's connectedness. As a case in point, prior research consistently revealed that synchrony increases rapport and a feeling of connectedness with the interaction partner (Hove and Risen 2009; Macrae et al. 2008; Valdesolo et al. 2010; Wiltermuth and Heath 2009). In a similar vein, it has been shown that moving in synchrony with another person increases the perception of similarity (Valdesolo and DeSteno 2011). Extending these findings, we showed that the opposite pattern may occur. Indeed, our findings reveal that the feeling of connectedness and the perceived similarity between the self and the interaction partner may foster behavioral synchrony.

Our findings also make a novel contribution to the literature on the implication of morality for social perception. First of all, extending previous evidence on the key role of honesty in predicting impressions and evaluations of unknown others (for a review, Brambilla and Leach 2014; Goodwin et al. 2014), the current study reveals that honesty is also primary in predicting real, concrete behavior. In particular, going beyond explicit responses, our findings suggest that the prominent role of the honesty facet of moral character in social perception extends to nonverbal behaviors, such as interpersonal synchrony.

Interestingly, we found that depicting a social target as dishonest has a stronger impact on behavioral synchrony than depicting him as honest. Indeed, we found that the delay in synchronizing the movements with those of a dishonest partner was higher than the delay in synchronizing the movements with those of an unfriendly partner. By contrast, we did

not find any difference when we considered honest and friendly targets. This latter finding is consistent with prior research showing that immoral information—and in particular information referring to honesty—might have a stronger impact on social perception than moral information as such immoral information is highly diagnostic of the underlying moral character (Brambilla et al. 2011; Skowronski and Carlston 1987). Indeed, our findings confirm the salience of dishonest information and extend its effects to real behavioral responses.

Finally, our research has important social implications. Indeed, interpersonal synchrony is a key component of human social interaction that predicts socially meaningful behaviors (Hove and Risen 2009; Semin 2007; Semin and Cacioppo 2008). If we perceive another person as lacking honesty, we are less prone to coordinate our movements with him/her as a way to maintain social distance. In turn, less interpersonal synchrony can lead to less cooperative and pro-social behaviors toward the partner. This suggests that the best way to prevent social targets from engaging in a downward spiral of exclusion and relational devaluation might be to refrain from perceiving each other as lacking honesty. Moreover, since tasks that involve joint actions are facilitated by behavioral synchronization (Valdesolo et al. 2010), receiving negative information on others' honesty might have disrupting consequences for the achievement of common goals. Moreover, given that synchrony fosters self-other overlap and affiliation, one may argue that coordinating our movements with those of a dishonest individual would potentially lead to moral contamination. Thus, the delay in synchronizing the movements with those of a dishonest partner may be conceived as an adaptive mechanism likely to prevent negative effects on social life, group cooperation, and survival (Haidt 2007).

There are some limitations to the present research. It should be noted that we found significant results only considering temporal variables of the interpersonal behavioral coordination. By contrast, our manipulations did not affect other aspects of synchrony, namely the quality of movements during an interaction (Kimura and Daibo 2006; Semin 2007). This might be due to the nature of the experimental task that asked participants to imitate very simple and non-spontaneous movements. To address this limitation, future research could analyze the effect of distinct evaluative information on unconscious mimicry of gestures and postures (i.e., *chameleon effect*; see Chartrand and Bargh 1999).

Importantly, in our experiment synchrony was explicitly instructed (see, Lumsden et al. 2014). Thus, the lower levels of synchrony in the dishonest condition might be interpreted as a result of a motivational effort. Participants might have been consciously ambivalent about synchronizing their movements with those of an interaction partner of whom they had a negative impression and who they perceived as distant from the self. Alternatively, it is possible that even if synchrony was instructed, participants did not intentionally withdraw effort to perform the synchrony task. Indeed, research on the process dissociation model (e.g., Payne 2008; see also the QUAD model, Conrey et al. 2005) suggests a possible discrepancy between what individuals intend to do (i.e., the controlled component driving behavior) and what they actually do. This second process may be controlled or uncontrolled, independently of the goal awareness. Thus, automatic and controlled processes may occur separately or together in various combinations. According to this perspective, the effect of our explicit manipulation on behavioral synchrony might have been the result of a less deliberate motivational process. This intriguing possibility should be addressed by future research.

In a similar vein, an interesting avenue for future research would be to explore whether honesty exerts its effects on behavioral synchrony through not only a motivational, but also a biological substrate. Our findings revealed that participants' tension could not account for

the influence of the honesty facet of moral character on interpersonal synchrony. However, it should be noted that bodily tension was assessed through observation of independent coders. Thus, the possibility that participants' bodily tension could account for the effect of our manipulation on behavioral synchrony remains an interesting topic to be addressed by means of electromyography measures of muscular automatic activation. These points considered, our findings suggest that the honesty facet of moral character exerts a powerful influence on human social cognition driving even our nonverbal responses.

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Appendix: Honesty and Friendliness Manipulation

Honesty	Last evening I went to the cinema and near my seat I found a wallet with 300 Euros. I went to the reception desk and I helped to find the owner of the wallet.
Dishonesty	Last evening I went to the cinema and near my seat I found a wallet with 300 Euros. I took the money and then I left the cinema.
Friendliness	Last evening I went out for dinner with a friend and with some other people my friend knew that I hadn't met before. Despite this, I was friendly with everybody and talked to my friend's guests.
Unfriendliness	Last evening I went out for dinner with a friend and with some other people my friend knew that I hadn't met before. During the evening I was unkind with everybody and I did not talk to my friend's guests.

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